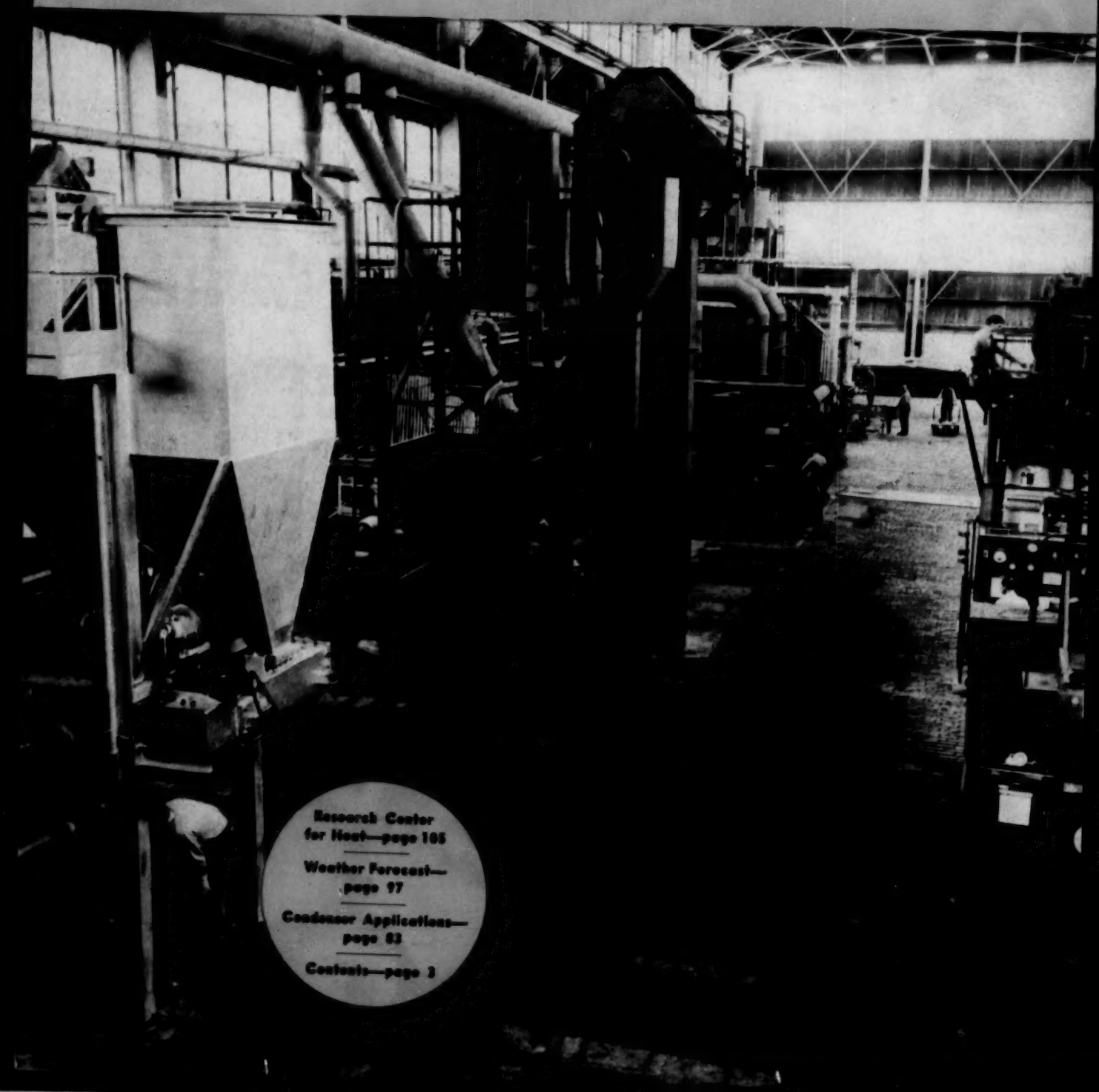
AIR CONDITIONING HEATING AND VENTILATING

JULY, 1955 – 52nd YEAR



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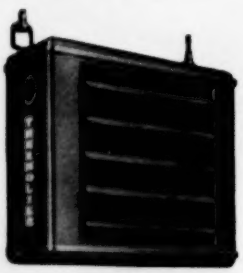
HEAT

you have it today . . . but how about next winter?

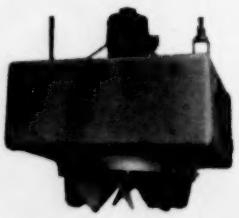
better get it now...with

GRINNELL UNIT HEATERS

Horizontal Gas-Fired Model for natural, manufactured, mixed and LP Gases.



Horizontal Model for steam and hot water systems.



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Available in 7 sizes — ranging from 25,000 to 200,000 Btu per hour input

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Three basic models—horizontal, vertical and a special horizontal Textile model. (Adjustable velocity nozzle also available for use on horizontal models.) All models have plain thermostatic trap, the simplest and least expensive kind of a trap, made practical because of unit's exclusive internal cooling leg; maximum capacity provided and destructive water hammer eliminated by built-in pitch of tubes. Many other important features.

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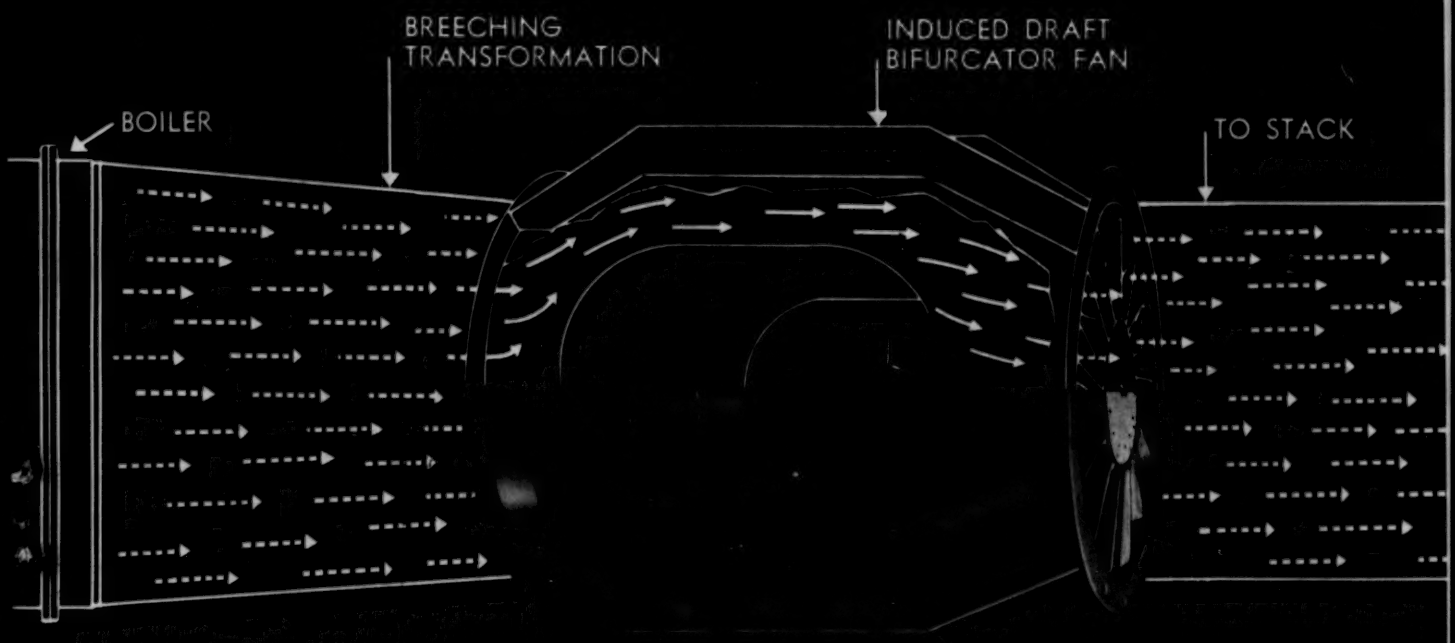

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Why go to the expense of erecting a tall stack? An Induced Draft Bifurcator fan gives you exactly what you want — positively controlled boiler draft in any weather.

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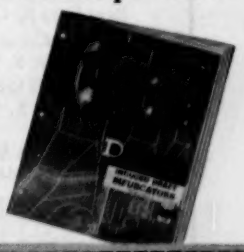
This axial-flow fan has a divided housing, so flue gases bypass the motor, which always stays clean, cool and accessible. For high-pressure boilers delivering up to 60,000 pounds of steam per hour — and for low-pressure boilers rated up to 190,000 EDR. Send coupon for catalog.



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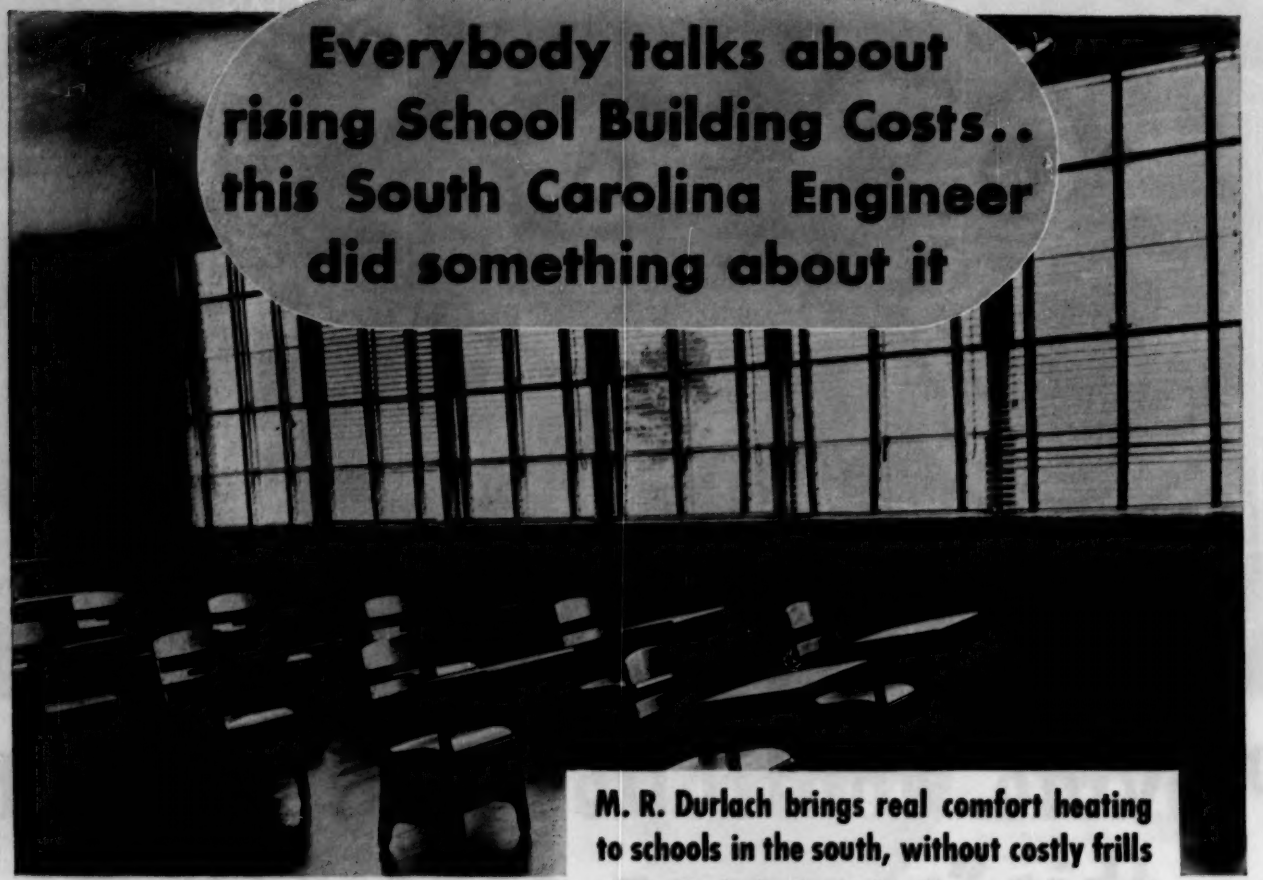

Classroom in Edwards Elementary School, Chesterfield, S. C. Total sq. ft. 99,125. Cost (not including land, financial and legal) $282,921. Heating cost $23,179. Architect: James & DuRant, Sumter, S. C. Consulting Engineer: M. R. Durlach, Jr., Columbia, S. C. Heating Contractor: M. W. Turnage, Chesterfield, S. C.

SOME SCHOOL HEATING INSTALLATIONS ENGINEERED BY M. R. DURLACH USING WEBSTER WALVECTOR FOR TRU-PERIMETER HEATING

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AIR CONDITIONING HEATING AND VENTILATING

JULY, 1955

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The Cover: Testing on several pilot plants at the Babcock & Wilcox Research Center in Alliance, Ohio, simulates service conditions for a variety of energy utilization situations as described in this month's news department.

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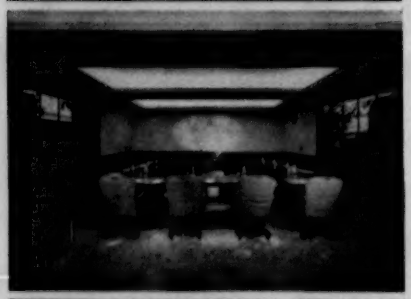
ROTARY'S new headquarters

On its 50th anniversary Rotary International welcomes its members from 8600 clubs in 90 different countries to visit its new headquarters in Evanston, Illinois.



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Publishing The ROTARIAN with a monthly circulation over 360,000 and handling over a million and a half pieces of incoming and outgoing mail annually . . . are only a few of the many activities carried on in this handsome new building.

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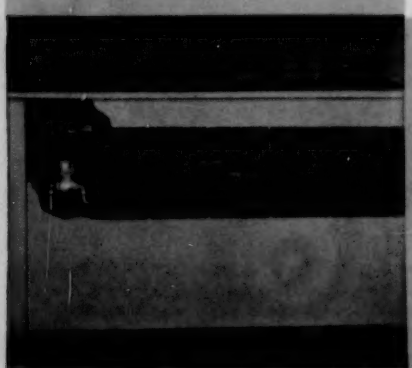
Powers air conditioning control began almost 50 years ago in the Congress Hotel Gold Room in Chicago. Experience gained there and in thousands of other prominent buildings is now available to you.



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HIGH SPOTS

Shipments of fans, blowers, and related equipment in the first quarter of 1955 were valued at $54.4 million, up 40% over the fourth quarter of 1954. Orders booked were also up 40%. Shipments of unit heaters and related equipment were down 22% over the same period.

Five air conditioned taxicabs have been sold by a Long Island City firm for use in New York City.

Third highest expenses for lobbying at the State Capitol ($14,133) were reported by the New York State Society of Professional Engineers, which opposed a bill that would have permitted corporations to practice professional engineering. The measure was not passed.

Tallest building in Latin America, the 46-story, air-conditioned Latin-American Insurance Co. Building nearing completion in Mexico City, actually floats on clay footings with four 180-ft piles sustaining 40% of weight. All piping is copper, including drainage.

Industry's spending for **new plants and equipment** is on the upturn after two years of decline. Second quarter—April through June—hit a $27.86 billion a year pace, with $28.83 billion pace forecast for the midsummer quarter. Year's total may reach $27.8 billion—only 3 to 4% below record 1953.

A lightweight, low cost, passenger train being built by General Motors to carry 400 passengers 100 miles per hour will demonstrate low center of gravity and Diesel power.

Shipments of plumbing fixtures during 1954 were valued at $300 million, a $22 million increase over 1953, according to the Bureau of the Census.

Stanford Research Institute has been awarded a grant of $26,000 by the Rockefeller Foundation to assist more than 25 foreign scientists to take part in the World Symposium on Applied Solar Energy next November 1-4 in Phoenix, Ariz.

New orders in 1954 for steel power boilers of 100 sq ft heating surface and over totaled 5,496 units, representing a decrease of 3% in units and 10% in heating surface from 1953.

Four hundred fifty tons of refrigeration for air conditioning the new T-V Color Studios of National Broadcasting Company, at Burbank, California, are supplied by two centrifugal refrigeration systems furnished by Worthington Corp. The contractors were The Austin Co., Los Angeles.

About 40% of all municipalties having building regulations in New York State are operating under the State Building Construction Code.

April shipments of automatic hard coal burning equipment in commercial sizes were 33% ahead of April 1954, according to Norman C. Curtin, consultant to Anthracite Information Bureau.

The air conditioning industry will create about 400,000 more jobs for American workers by 1960, according to George S. Jones, Jr., managing director of Air-Conditioning and Refrigeration Institute.

WASHINGTON OVERTONES

by LORING OVERMAN

Politics sits at the Washington console as the finale of the current session of Congress approaches. Oddly enough, much of the legislation nearing approval was recommended by the President in his several messages to the Democratic-controlled Congress.

The political overtones of present happenings lie in the fact that legislative provisions are much less conservative than those asked by the President. In several instances, controversial overtones have been muted, but one has the feeling that the political strings continue to vibrate, and that next year may find them giving off new and insistent sounds.

Running the scale:

Congress is only weeks away from scheduled adjournment, but with a unique situation existing. The Senate, frequently bogged down by long debate, is far ahead of the House on major legislation completed. Among items completed by the Senate, but not acted upon by mid-June in the House:

- **A $3.4-billion foreign aid** authorization measure.

- **Omnibus housing bill** continuing all phases of FHA program and expanding public housing from 70,000 units suggested by President, to 540,000 in next three fiscal years. Continues Title I home improvement loans five years; raises ceiling to $3,000 from $2,500. Authorizes $4 billion additional mortgage insurance authority for FHA. House is expected to cut back public housing total.

- **Bill raises minimum wage** from present 75 cents hourly to $1.00. Defers as a political overtone certain proposals to broaden coverage of Wage-Hour legislation.

- **Another authorizes a five-year, $18-billion federal-state highway** construction program. Again the overtone: Accepting the need for program; insisting on Senate method instead of President's proposal.

- **No. 5 authorizes billion dollar programs** for dams and power throughout Rocky Mountain area.

Defense Developments include:

- Senators Capehart (R-Ind.) and Frear (D-Del.) have introduced simple **two-year extension** of present Defense Production Act, scheduled to expire June 30. Neither bill requests standby control over wages, prices, or rents.

- **A recheck of all defense production goals** has been asked by a new interagency committee of the Office of Defense Mobilization. Creeping shortages of aluminum, particularly for small producers of civilian goods, has spotlighted possible need for more production capacity.

- **Question of steel capacity** was being reviewed in mid-June, with Office of Defense Mobilization insisting on shape-and-form breakdown; Steel Industry Advisory Committee promising data. Preliminary indications were that overall capacity may be adequate, but shortages may exist in capacity to produce certain defense-needed forms.

- **Electric power industry** has sufficient existing capacity to meet all needs "for first 12 months of an all-out war"—assuming restriction on use of electricity for luxury purposes. Estimate, made by the Interior Department's Technical Review Staff, was questioned by some on the committee. Although no immediate problem is foreseen, electric power goals have been reopened. Of 56 applications for amortization certificates, 32 have been approved for production of a total of 3,379,250 kilowatts.

(*Continued on page* 8)

The Invisible Enemy No. 1

UNDERMINES BUILDINGS, DESTROYS TIMBER; CAUSES COLD, FUEL LOSS, DISCOMFORT IN WINTER.

Each pound of water vapor which escapes from a building in winter robs it of 1,060 Btu's of heat!

It took 1,060 Btu's of latent heat to change that pound of water to a pound of vapor; heat lost to the outside which otherwise would have been profitably employed in heating the building; heat which cost fuel and money to produce.

When that vapor condenses in outer building spaces, it instigates fungus growth and timber rot; peeling paint, crumbling plaster and masonry.

Defend the building by strategically placing barriers of non-corrosive sheets of metal on the WARM side of exterior walls and roof spaces.

"BORING FROM WITHIN"

Bar this invisible enemy—VAPOR—with impenetrable metal which is almost completely impervious to its flow. Each sheet of metal must be of full width, reaching from joist to joist; and of full length, continuous, without breaks every few feet.

These metallic barriers will help expel fortuitous vapor from building spaces (for instance from rain), because where walls or roofs have at least 5 times the permeability of a "barrier", vapor will flow to the outdoors, obedient to Nature's law that vapor flows from areas of greater density to those of less. Since the vapor cannot back up into the building through the wide, long, almost completely impervious, and continuous metal, it will flow out **harmlessly** as a gas, through walls and roofs. (At 32° F. vapor has 1/205,000 the density of water; at 0° F., almost one-millionth its density.)

If building spaces are **defended scientifically** by MULTIPLE sheets of such insulating metals, properly air-spaced apart, condensation formation on or within them is reduced to a minimum.

The temperature of two rooms, 13' x 14', and 8 feet high, could be raised as much as **20° F.** by the equivalent of the latent heat of vaporization of **one pound of water vapor.**

A pint bottle will hold approximately one pound of water. An average family and its activities produce 5 lbs. to 12 lbs. of water vapor daily, consuming 5,300 to 12,720 Btu's. Indoor clothes washing and drying produce an additional 30 lbs. of vapor involving 31,800 Btu's.

MISSION ACCOMPLISHED

250 MILLION sq. ft. of multiple accordion aluminum have been used in the last 9 years by many of the leading architects, engineers and builders of America, a large part of it repeat orders resulting from satisfactory anti-Vapor and anti-Condensation PERFORMANCE, as well as drastic heat loss reduction.

A new uniform-depth "full-coverage", multiple accordion aluminum insulation (patent applied for) is now on the market.

USE COUPON FOR VALUABLE BOOKLET

The National Housing Agency warns against water vapor. It tells how to cope with some of the problems in an interesting pamphlet, "Technical Bulletin No. 38," based on tests made by the National Bureau of Standards. To obtain a FREE copy at our expense, send coupon.

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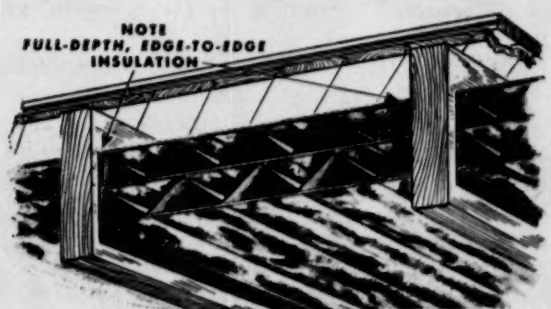
Multiple Aluminum Insulation installed in new construction between wood joists, material and labor

Type 6-PS about 10¢ sq. ft. Type 4-PS about 8¢ sq. ft.



FOR MAXIMUM PROTECTION

Each sheet stretches from joist to joist and throughout the flanges for further vapor protection and permanent attachment.

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WASHINGTON OVERTONES (*Continued from page 6*)

Economic outlook continues bright, with no discords expected if industry and labor keep the peace.

• Secretary of Commerce Weeks expects the year to establish records, **labor peace permitting,** with no second-half letdown. Current gross national product rate of above $370 billion a year, should continue for six months or more, he says. Recent settling of Ford and GM wage contracts permits optimism in the labor-management field.

Economy outlook is far less clear. Political overtones make it difficult to concentrate on the money-saving theme. Tendency is to give a little here, a little there, rather than run the risk of political discord. Consequently, a lot of little gives can total up to billions, and to unbalanced budgets.

• **Recent typical example of waste** is pointed out by Hoover Commission's Task Force of Real Property Management. Reports say government is managing its $40.8 billion worth of real property under "a decentralized and wasteful system requiring the fulltime services of 370,000 federal employees." Adoption of Task Force recommendations, the committee observes, would save as much as $185 million annually, and return more than $1 billion to the Treasury through disposal of surplus plants and properties.

Next note, Finance. President Eisenhower told one of his press conferences that budget balance must precede tax cuts. Little chance of that this year; but the overtones suggest a try during election year.

• Most interesting of the tax suggestions in Washington is a proposed Constitutional amendment to limit income taxes on individuals and corporations to 25%. Idea was proposed by Senator Dirksen and Rep. Chauncey W. Reed, Illinois Republicans. A statement favoring the plan was inserted in the Congressional Record by Rep. Ralph W. Gwinn (R-N.Y.). It's good reading.

G is for Gas on the overtone scale. Actions, three:

• House Interstate Commerce Committee approved Harris bill (H.R. 6645) to free independent gas producers from control by Federal Power Commission.

• Senate Interstate Commerce committee completed hearings, clearing decks for action.

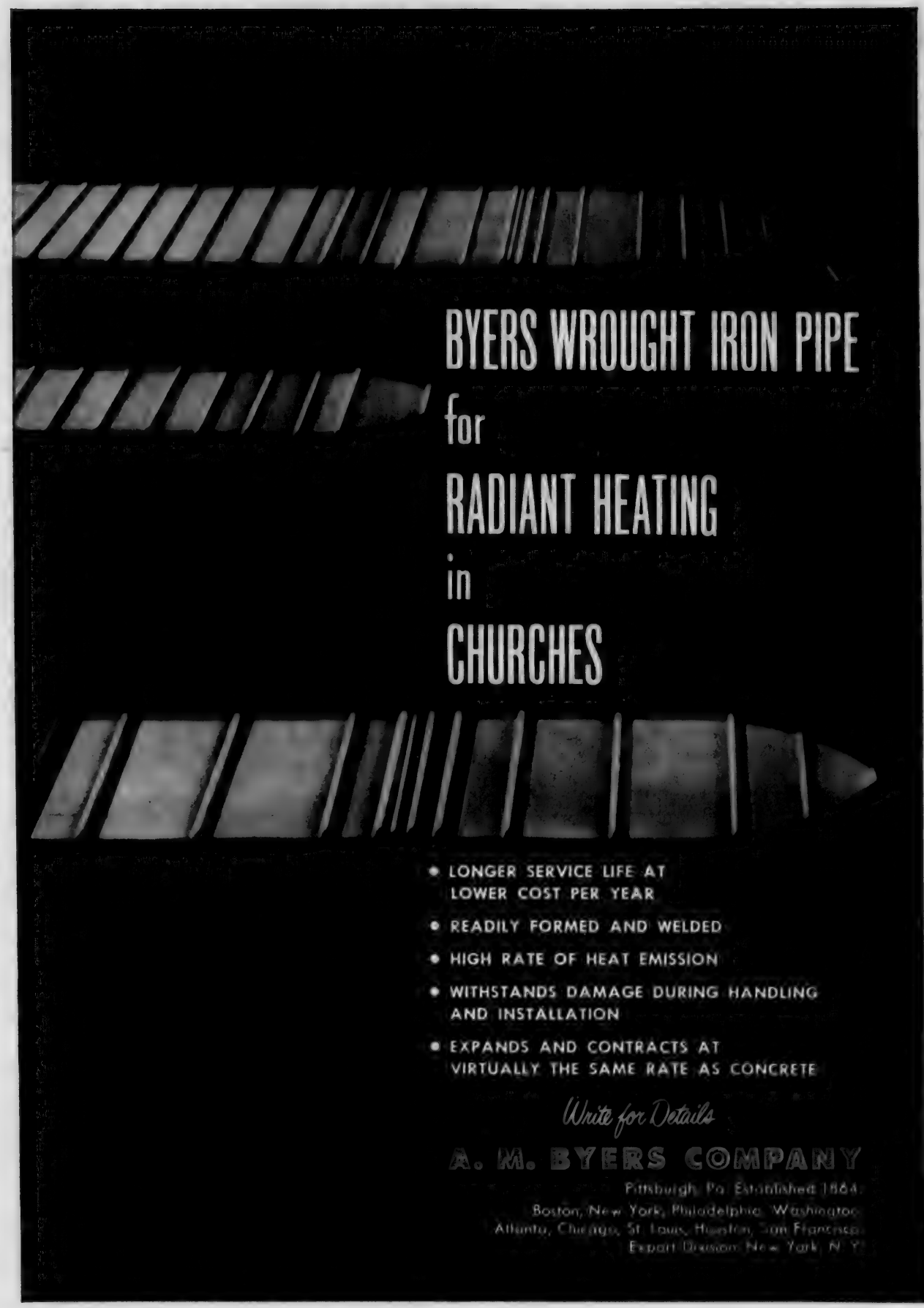
• Representative Oren Harris, author of House bill, introduced resolution asking for Interstate Commerce Committee hearing on why consumers pay some 10 times the field cost to the producer. Need for the investigation, Harris said, was signalled by the close House IC Committee vote of 16-15 to approve the bill. Harris intimated there may be plenty of opportunity for constructive changes favorable to both producer and consumer.

Atomic Energy merits a place on any Washington clef. Any firm or individual of engineering bent will do well to keep informed of atomic ramifications.

• Atomic Energy Commission has granted 67 **access permits** to organizations and individuals authorizing them to obtain classified information for use in exploiting atomic energy.

• Atomic Energy Commission has asked the House Appropriations Committee for a marked **increase in funds** for fiscal 1956. Sought is $1.5 billion—approximately $400 million over the current budget. This does not include funds for construction and other capital outlays. These are to be contained in a separate request. One billion is for production of fissionable material; $271 million for weapons; $37.9 million for development of a nuclear-power plane.

• Even the economy-minded Hoover Commission continues to urge increased expenditures for **basic research.** Recent report deplored the minor amount of basic research into the laws of nature and the nature of materials. The report continued, "Yet the safety, the increase of productivity and the advancement of health in our nation must come from increasing knowledge through fundamental research."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Pittsburgh, Pa. Established 1864
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BRIEFLY STATED

• Combustion Engineering, Inc. has announced plans to construct a new and revolutionary type of mechanized foundry for the production of cast iron soil pipe and fittings. The foundry will be constructed at Chattanooga, Tenn., at a cost in excess of 3 million dollars and is expected to be completed in from 15 to 18 months.

• Declaring a national need for plastic pipe standards, 35 representatives of manufacturers and consumers of plastic pipe, and technical societies, have urged the American Standards Association to initiate a project for uniform dimensions. The Society of the Plastics Industry and the American Society of Mechanical Engineers will take administrative leadership in the project as sponsors for the proposed American Standard.

• Sales of room air conditioners during the first quarter of 1955 increased 30% over the same period of last year, according to figures released by George S. Jones, Jr., managing director of the Air Conditioning & Refrigeration Institute. At the same time, Mr. Jones announced, inventories at the wholesale and factory levels are down nearly 12% indicating a rapid liquidation of last year's carry-over.

• Alexander L. Naylor has been elected president of The Fairbanks Co. Mr. Naylor has been executive vice-president of the company for the past ten years, prior to which he was assistant to the president. He succeeds his father, George M. Naylor, who was president from 1924 until the time of his death in April of this year. In his new capacity Mr. Naylor heads a company that was incorporated in 1891, although it traces its history back to the early 1830's. The Fairbanks Company manufactures bronze and iron body valves in Binghamton, New York, and materials handling equipment in Rome, Georgia.

• Carl F. Brooks of Dayton, Ohio, code representative of the Frigidaire Division of General Motors Corp., has been elected chairman of the Refrigeration Industry Safety Advisory Committee. Other officers elected by the group are: Vice chairman, R. L. Williams, Kinetic Chemicals of Wilmington; treasurer, Geo. S. Jones, Jr., managing director, Air-Conditioning and Refrigeration Institute of Washington, D. C.

• Norbute Corp., 383 Madison Avenue, New York, producers of uranium ore, has acquired Jackson and Church Co., process-engineering equipment manufacturers of Saginaw, Michigan, through an exchange of stock. Norbute was known formerly as the North Butte Mining Company which was organized in 1905 and located adjacent to Anaconda Copper Mining Co. in Butte, Montana. Jackson and Church, established in 1881, operates several divisions. Best known is the winter air-conditioning equipment division, processors of all types of forced warm air furnaces from plants for commercial installations to furnaces for the home. Defense work includes the manufacture of the two giant steam catapults for the USS Forrestal. The company has also developed revolutionary new plastic injection molding machinery for rigid PVC and, through a 50% owned subsidiary, Tube Turns Plastics, Inc., in association with National Cylinder Gas Co., is completing a major production plant in Louisville, Kentucky. Jackson and Church has processed and developed a new building industry material—a lightweight aggregate (Calsi-Crete) for which the first production plant is nearing completion in Ann Arbor. The company also has substantial holdings in Detroit Brick and Block Co., manufacturers of a high quality face brick. This brick, unique in the industry, is made from the residue of acetylene gas.

• Eric A. Kerbey was elected president of Midwest Piping Company, Inc., St. Louis, Mo., at the May 17 directors' meeting. Mr. Kerbey has been with the company since 1928 when he established the Chicago sales office. A year later he was made eastern manager. In 1942 he transferred to St. Louis where he has been executive vice president for the last eleven years. A. G. Stoughton, who has been president of Midewst since its formation, will continue as chairman of the board and chairman of the executive committee.

• Appointment of Taylor G. Nelson as sales manager for the appliance controls division of Minneapolis-Honeywell Regulator Co., was recently announced. At the same time it was reported that the division will occupy new plant facilities, now under construction at Gardena, Cal.

• York Corp. has started construction of a giant cooling system to be installed in the Capitol Power Plant in Washington, D. C., from which it will serve the air conditioning systems in seven large government buildings within a two-mile circle. Four large centrifugal refrigeration units using about 10,000 horsepower will provide chilled water to a loop system holding about 600,000 gallons and which government engineers say is the largest hydraulic refrigeration system of its kind in the world.

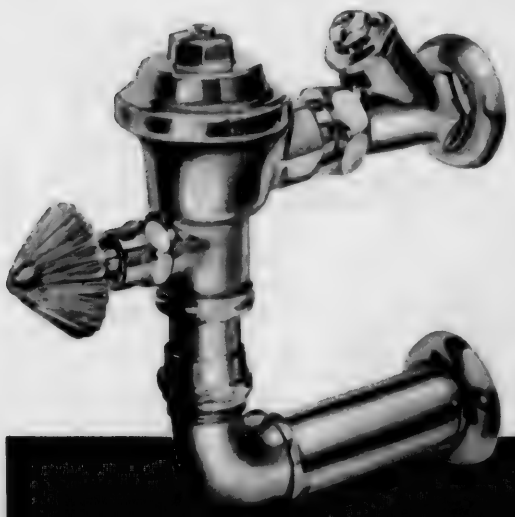
• Carl E. Buchholzer, president of Chrysler Airtemp has been elected to membership on the Board of Directors of the Air Conditioning and Refrigeration Institute—for a three year term, representing the Air Conditioning and Refrigeration Systems Section.

• Appointment of Cletus J. Oster to the position of plant superintendent of the Farr Company, Los Angeles, California, manufacturer of air filters and related equipment, has been announced. Since joining the company eight years ago, Mr. Oster has served in the capacity of project engineer and assistant chief engineer.

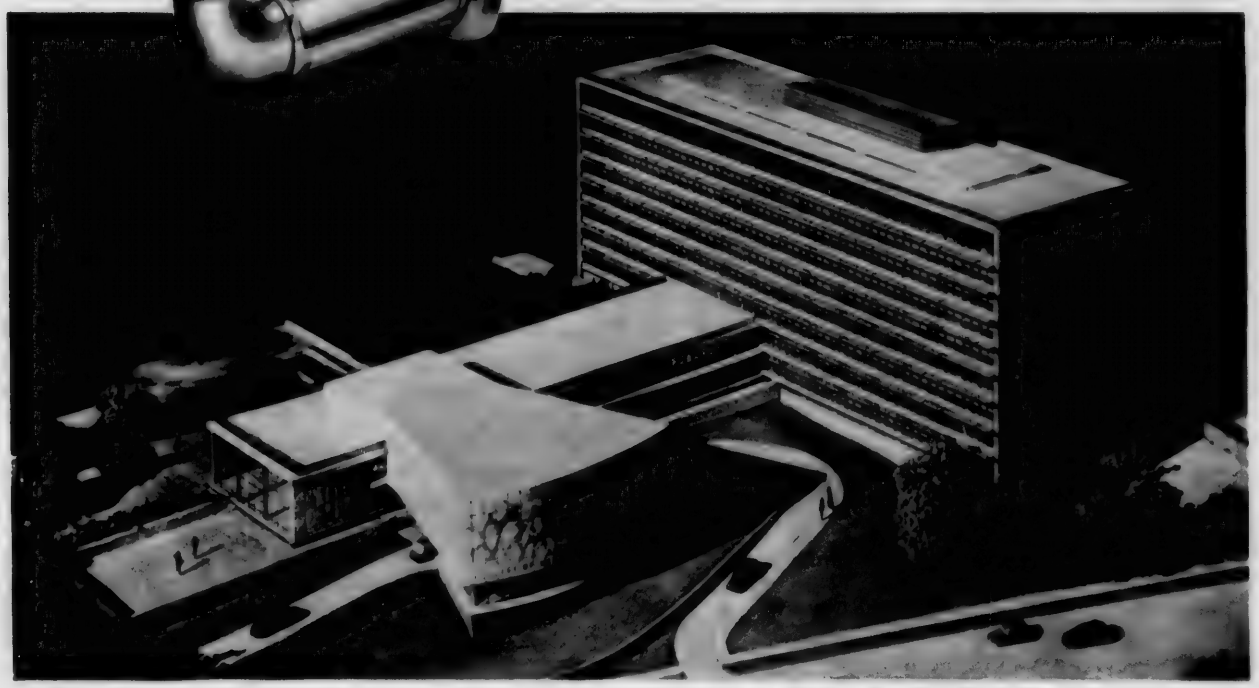
• Hellmuth Walter has been named director of research at Worthington Corp. Mr. Walter was born in Germany and is a graduate of the Hamburg Engineering College and did post-graduate studies at the Technical University of Berlin. After World War II, Mr. Walter worked with the British Admiralty for over four years and in May of 1950 came to this country to work as a consulting engineer at Worthington's Wellsville Works. In 1951 he was transferred to the Corporation's headquarters at

(*Continued on page* 12)

And in New York – A FUTURE OF FAULTLESS SERVICE



First unit of a comprehensive medical center is this well planned COYNE & DELANY installation – a handsome "campus" for the new Albert Einstein College of Medicine. Rising on a hilltop in upper New York City near two new municipal hospitals, a fan shaped auditorium with brilliant mosaic facing will contrast with the ten story glass walled teaching section. Utilizing a fresh concept in instruction, each student will be assigned to his own "office laboratory." An equally contemporary approach in the area of plumbing design included the specification of wall hung toilet fixtures with COYNE & DELANY foot pedal flush valves throughout. Here, and in all types of projects where mechanical equipment is carefully considered, you will find DELANY–"the fastest growing name in flush valves."



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This new "HAND BOOK and CATALOG No. 53" is the most comprehensive of its kind–designed for everyday reference . . . 19 pages of installation details for exposed, concealed and special FLUSH VALVE installations . . . over 75 blue prints . . . cut away views . . . many pages of charts, formulae, piping details . . . sent free, if requested on firm letterhead.

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IN CANADA: THE JAMES ROBERTSON CO., LTD.

DELANY *Flush* VALVES

Since 1879

BRIEFLY STATED

(*Continued from page* 10)

Harrison, N. J. Mr. Walter was the German Navy and Air Force's top specialist in the development and use of hydrogen peroxide as a propellant for submarines, trackless torpedoes, and for rockets on numerous applications. Robert S. Sherwood has been appointed assistant director of research at Worthington. Mr. Sherwood joined Worthington in 1951 as a consulting engineer. He completed his undergraduate work at Texas A. & M. College and received an MS Degree at Iowa State College in 1939. He later obtained a Professional Degree in Mechanical Engineering from Texas A. & M. After several years with the National Supply Co. and the U. S. Army Corps of Engineers, he joined the faculty of Iowa State College as a Professor of Mechanical Engineering.

• A new inspection tool which makes use of radioactive Cobalt 60 and is capable of radiographing—or seeing through—thicknesses of steel up to seven inches, has been developed by The Babcock & Wilcox Co. The unit has been christened the Isoscope, a derivation of the words isotope, a radioactive material, and scope, for the power to see through metals. The Isoscope which has been under study and development by B&W for the past three years, requires only one-third the exposure time of a million volt X-ray unit. The largest allocation of radioactive Cobalt 60 ever authorized to industry for radiographic work was assigned to B&W for the project.

• Ralph M. Watson will leave Worthington Corp. to accept an appointment as associate dean of the L. C. Smith College of Engineering, and chairman of the Department of Mechanical Engineering, Syracuse University. Mr. Watson has been director of research for Worthington.

• A new high for installation of hot water and steam heating systems in new residences was achieved in 1954, according to the Institute of Boiler and Radiator Manufacturers. Complete tabulations show home heating systems using boilers of all types were installed in 30 to 35% of new homes built in 1954, a gain of about 5% over 1953. Credit for the rise is attributed to increasing popularity of the perimeter baseboard type of hot water heating, coupled with the introduction of new equipment to provide year-round comfort systems.

• Robert V. McCallister has been appointed sales manager of equipment and industrial sales of the L.O.F. Glass Fibers Co., Toledo. Before his new appointment, Mr. McCallister had been sales manager of the General Products Division and previously New York Branch maanger of Glass Fibers Inc., which merged with the new L.O.F. Glass Fibers Company on March 1, 1955.

• Formation of the Better Heating-Cooling Council to promote the use of hot water and steam heating systems in residential construction has been announced by Paul K. Addams, president of the Fitzgibbons Boiler Company, Inc. The Council, representing four of the leading manufacturers' associations in the heating field, has named Mr. Addams as its president. He is a member of the executive committee of the Steel Boiler Institute. Vice president of the Council is Robert W. Lear, general marketing manager, Plumbing and Heating Division, American Radiator and Standard Sanitary Corp. Secretary-Treasurer of the Council is Robert Ferry, general manager of IBR. Other Council members include Robert S. Rickabaugh, president of the Convector Manufacturers Association, H. Leigh Whitelaw, managing director of GAMA, and Robert A. Locke, president of the SBI.

• S. Byron Stone has been appointed advertising and sales promotion director of the Typhoon Air Conditioning Company, Inc. Mr. Stone has served as an advertising and sales promotion manager, agency account executive, copy chief, and creative art director. He was responsible for the organization and direction of the public relations program publicizing the International Machine Tool Exhibition, held in 1953 in Olympia-London for the British Industries Corporation. Mr. Stone also organized, designed and handled the contracting for the New York Civil Defense Exposition of 1952-3.

• American Radiator & Standard Sanitary Corporation has established a new division to coordinate all of the corporation's activities in the atomic energy field, commencing with the development of complete reactor systems and components. Frank A. Parker has been appointed director of the new division, and David J. Mallon has been named director of research operations. Headquarters of the division will be in Redwood City, California, where the corporation has one of its research laboratories.

• The first of a series of annual market research studies of consumer attitudes toward air conditioning will be undertaken by the Du Pont Co. this summer as an industry service. Room air conditioners will be the focal point of the first survey. Results of the study are expected to be announced early next fall.

• J. A. Zurn Manufacturing Company, 1801 Pittsburgh Avenue, Erie, Pennsylvania, has been accepted for membership in the Building Research Institute, Washington, D. C., technical society for the building industry, it was announced today by William H. Scheick, Institute Executive Director. The firm manufactures industrial and marine plumbing, and will be represented at Institute activities by John H. Schmid, director of research, and Louis E. Blendermann, director of Engineering, both from the plumbing division.

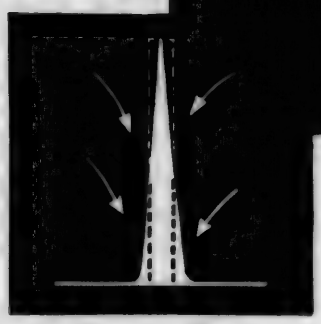
• Frank F. Elliott, senior vice president of sales for Crane Co. since 1952, has been elected president and chief executive officer of the company. He succeeds John L. Holloway, who resigned as president and director because of ill health. Mr. Holloway, who was elected president in 1946, will continue as a consultant to the company. Mr. Elliott, who assumes the leadership of Crane Co. as it approaches its 100th anniversary on July 4, is a veteran of 33 years with the organization. He joined Crane in 1922 as a sales engineer at the company's Los Angeles branch and in 1928 he was named sales manager there.

Even More Surface

per sq. ft. of face area

Even Less Air Friction

with the New AEROFIN Type B Smooth-Fin Heat Exchangers



Tapered Fin

The new smooth fin is tapered, with a wide contact base which conducts sufficient heat to make the entire fin effective transfer surface. It is no longer necessary to crimp the fin to provide the required contact area.

By eliminating the air resistance and turbulence caused by the wrinkles in the old-type coils, it is now possible to use almost twice as many fins per inch with no increase in air friction.

The resulting increase in capacity is obvious. As a consequence, these new coils offer you:

Greater capacity per square foot of face area

Lower airway resistance — less power needed to deliver the required C. F. M.

Smaller face area, due to the practical use of higher air velocities

Fewer rows of tubes for a given B.T.U. transfer in a given area

Less weight — easier handling

Better water drainage from water coils; improved venting and drainage for heating coils

Compact, sturdy design

Standardized encased units arranged for quick, economical installation

Aerofin is sold only by manufacturers of fan-system apparatus. List on request.

AEROFIN CORPORATION

SYRACUSE 1, N. Y.

HUGE APARTMENT GARAGE—Peerless #6B3, belt drive utility blower, ARR 3, 3HP, selected for continuous exhaust duty at swank Chicago apartment house.

HERRINGTON, KANSAS, Variety Store uses this vertically mounted PVS for general exhaust. Quiet operation makes PVS ideal for small store service.

Peerless® FANS AND BLOWERS

ENGINEERED FOR PEAK PERFORMANCE

Peerless fan and blower engineers and Peerless motor engineers work together to design and produce products that are guaranteed to meet our published performance standards. Right down the line these outstanding fans and blowers fill the bill on installations of all types.

Frames are all welded; wheels and fans are dynamically balanced and designed for smooth, quiet, air moving; motors are selected to match performance ratings; drives, belts, and controllers are chosen for specific jobs.

All of this engineering, designing, and manufacturing takes place under one roof. As a result, architects, engineers, and contractors can specify Peerless Electric fans and blowers with complete confidence.

Before you start to engineer your next air-moving job, check the two Peerless catalogs. If you require help in sizing or with any of your engineering, ask us. We'll see that you get the information you require. A letter will receive prompt attention from the engineer most familiar with your problem.

FAN AND BLOWER DIVISION

THE PEERLESS ELECTRIC COMPANY

FANS • BLOWERS • ELECTRIC MOTORS • ELECTRONIC EQUIPMENT

1400 W. MARKET ST. — WARREN, OHIO

BALTIMORE MARKET—Virtually all exhaust in this big market is handled by Peerless fans installed in Peerless penthouses with automatic shutters. Fans selected by contractor on approval of consulting engineer.

HUNGRY HORSE DAM—Fourteen Peerless units are integral units of the heat exhaust and fresh-air circulating equipment in this giant power plant at Columbia Falls, Montana.

Peerless Electric

GUIDES TO BETTER FAN AND BLOWER PERFORMANCE

BULLETIN SDA-160: Convenient reference to Peerless performance ratings, arrangements, discharges, and recommended ventilation data. Exhaust, ventilattic, and industrial fans; belt and direct drive blowers; pressure and radial blade blowers; blower-filter units are illustrated. Ideal for general use by architects, contractors, and engineers.

BULLETIN SDA-200: Full information on construction, performance, and applications of Peerless Non-Overloading Belt Drive Utility Blowers. Gives easy-to-use tables on dimensions, friction in straight ducts, rectangular equivalents of round ducts, recommended air changes, and maximum duct velocities. A convenient bulletin for general use by anyone specifying blowers.

Certified Ratings
AMCA
FEMA

For either or both Catalogs write:
Fan and Blower Division
The Peerless Electric Company
Warren, Ohio

Beardsley Terrace Housing, Bridgeport, Conn. • Engineers: Frederick M. Hill and Paul D. Harrigan, New Haven.
Architects: Lindsay & Johnson, Bridgeport. • Heating Contractor: Bridgeport Pipe & Engineering Co., Bridgeport. • General Contractor: E & F Construction Co., Bridgeport.

Here's why Mechanical Engineer is **enthusiastic about Sarcotherm in 1200-family 16-building project**

As Mechanical Engineer Paul D. Harrigan writes, "Sarcotherm steam heating controls in Beardsley Terrace Housing...working perfectly through extreme part of Winter as well as in Spring...sensitive, accurate and flexible...the Housing Authority, the architects and we ourselves are entirely satisfied."

Sixteen Sarcotherm Weather-Compensated Controls serve Beardsley Terrace. Of the continuous, modulated flow design, they provide individual zone control for the steam heating of each building. Precisely engineered orifice plates assure the proper steam flow to each heating unit.

COMPLETE SYSTEM — UNDIVIDED RESPONSIBILITY

Sarcotherm engineers cooperate in the preparation of working drawings and wiring diagrams for each job, and follow through with on-the-job help and supervision of installation.

Sarcotherm assumes undivided responsibility because the Sarcotherm System is COMPLETE—includes zone controls, panels, thermostats and steam specialties—traps, valves, and air eliminators.

Write for further details. Sarcotherm Controls, Inc., Empire State Building, New York 1, N. Y.

FEATURES OF SARCOTHERM CONTROL SYSTEMS

1. **Easy to install**—working drawings and wiring diagrams furnished for each job.
2. **Easy to maintain**—because of simplified construction, fewer parts.
3. **Easy to adjust**—to any desired setting.
4. **Engineered orificing**—assures even heat flow to all units from the start.
5. **Undivided responsibility**—by one maker, Sarcotherm, for the complete control system.

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WEATHER-COMPENSATED CONTROLS FOR **STEAM, HOT WATER AND RADIANT** *HEATING*

THE ONLY Matched

COOLING TOWERS and CONDENSERS

The Halstead & Mitchell Cooling Towers you select are *matched* by design to work with the famous Halstead & Mitchell water-cooled Condensers. You need no longer buy a high-efficiency cooling tower to work with a low-efficiency condenser (or *vice-versa*) . . . a long-life cooling tower to work with a short-life condenser (or *vice-versa*).

Remember that every cooling tower you sell is planned to work with a water-cooled condenser—then you'll see why America's leading manufacturers of air-conditioning and refrigeration equipment have swung to Halstead & Mitchell for their original equipment needs in both these components.

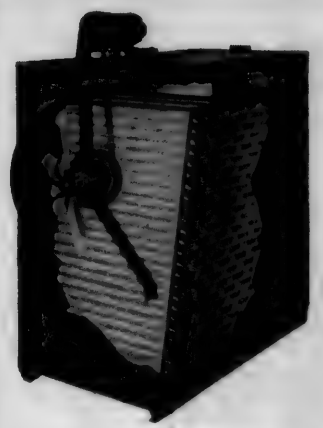
With cleanability you'll sell more. Why sell less?

20-Year Guarantee!

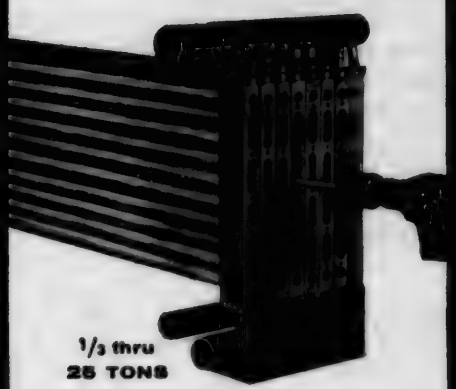
on the wetted deck surface against rotting or fungus attack

Only Halstead & Mitchell pressure-creosoting can provide a *guarantee* against immediate attack by fungus and marine parasites . . . or chemical deterioration from acids in water.

Added to this H&M exclusive are other major advantages. There's ultra-high efficiency in the gravity-type water distributing pan which eliminates extra pumping head required on spray type towers . . . and cuts down on water losses due to "atomizing" of water. And there's extra-long life in stainless steel fans . . . and sheet steel cabinets hydraulically painted with vinsynite, vinyl zinc and chlorinated rubber.



2 thru 120 TONS



⅓ thru 25 TONS

Lifetime Cleanability

The *mechanical* cleaning of H&M double-tube, counter-flow condensers means the simplest, least dangerous method of restoring new unit efficiency. Whether removing a heavy coating of sludge and scale, or a thin insulating film on the inner walls of the copper tubing, the mechanical cleaning tool restores heat transfer efficiency in a matter of minutes. The result is lowered discharge pressures . . . more heat carried off by cooling water . . . lower bills. *Only* the impurities are removed . . . the thickness of the copper wall remains intact, and the condenser gives extra years of peak service.

At Leading Heating and Refrigeration Wholesalers EVERYWHERE

Write for Detailed Specifications

Halstead & Mitchell

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Everything must be CONSTANT...

. . . at the Armour Pharmaceutical Laboratories at Kankakee, Illinois. In an atmosphere of hospital cleanliness, Armour's ultra-modern plant produces miracle drugs for man's ever constant war against disease. And the constant, positive air removal of Gallaher Air-Vans® assures the proper atmosphere for this important production. Forty-three Gallaher units serve the plant, carrying the fumes from eleven buildings.

The most important station for the power exhausters is on top of the fume hoods in the quality control room. This is the area where tests are conducted to see that production is up to Armour standards. Such pharmaceuticals as Gamma Globulin, Acthar, Insulin, Tryptar, Biopar, Thyroid and other compounds are the products that require such standards of purity.

• • • • • •

Low silhouette, easy installation directly to the duct system, ease of maintenance—these are Gallaher features. The Gallaher unit achieves positive air removal by its patented design of the built-in scroll effect. But there are other reasons why more and more engineers and architects are realizing the value of Gallaher Power Exhausters. The patented air seal-off, low noise levels, availability in special metals, and weatherproof design are all features that have made Gallaher the recognized leader in the field of industrial ventilation.

Direct Drive units 150-11,000 CFM. Belt Drive 3500-65,000 CFM, developing static pressures to 4".

For further information write

The GALLAHER Company

Patents 2188741 2526290
Patents pending

Pioneers in Research-Designed Power Roof Exhausters

4108 DODGE ST. OMAHA, NEBRASKA

Sign Up **SPORLAN'S CHAMPIONSHIP TEAM for PEAK PERFORMANCE throughout your entire AIR CONDITIONING SEASON**

because

like any Top Team **SPORLAN** offers you **PEAK PERFORMANCE** at *Every* Position...

...TIONING FIELD

Position 1

The Catch-All is the perfect filter-drier, assuring you clean, dry, acid-free, sludge-free refrigerant!

Position 2

Nothing can touch the Peak Performance of Sporlan's Solenoid Valves. They're tight closing, their coils are layer wound and so well insulated, they defy electrical failure!

Position 3

No hunting here, thanks to Sporlan's Thermostatic Expansion Valves with Flow Master elements. You can be sure of Peak Performance without ever worrying again about alternately flooded and starved evaporators!

Position 4

Sporlan Peak Performance Distributors have a perfectly designed nozzle and conical button to assure uniform distribution to all circuits.

SPORLAN

So Remember, when you're lining up your positions for a championship air conditioning team... Buy Sporlan Right-Down-The-Line and get Peak Performance throughout your entire air conditioning season.

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HOME OR BUSINESS

Kennard KT Cooling Tower—Engineered for long life. Centrifugal fan, vertical air discharge, Redwood wetted deck, Galvanized construction throughout. Brass and Bronze trim. Compact and quiet to place in your home. Efficient and rugged for outdoor commercial use.

In Stock—Order Yours Now

Indoor or Outdoor—sized to meet your requirements. 3, 5, 8, 11 and 16 ton capacities. Ask for Catalog KT-3.

DESIGNED FOR THE HOME

The All New Water Saver QT COOLING TOWER

WATER TURBINE DRIVEN fan eliminates electrical connections to the tower and unsightly outdoor wiring and reduces installation costs to a minimum. The FIBERGLASS REINFORCED PLASTIC cabinet and sump pan, combined with clear heart of redwood deck and Stainless Steel grilles, makes it the most corrosion resistant tower available.

Pleasing green color (never requires painting), low in height (42"), vertical air discharge, safe for children and pets. Install outdoors. Sizes 3 & 5 ton. Ask for Catalog QT-2.

KENNARD CORPORATION
1823 S. HANLEY RD. • ST. LOUIS 17, MO.

Four 75 TON COOLING TOWERS

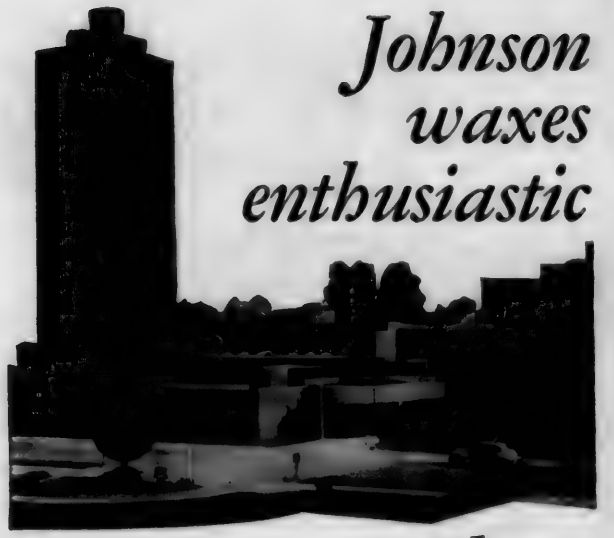
The Philco Corporation, with its great store of engineering knowledge, selected Kennard Cooling Towers.

Kennard Engineered Cooling Towers are built in 8 sizes—from 15 to 75 tons. Durably built, generously proportioned, designed for maximum service and accessibility.

Compare before ordering, and you too will select Kennard:

- Completely corrosion proofed, hot-dipped Galvanized (after fabrication) wheels and scrolls, sump, blower section and panels. Stainless Steel or Bronze fastenings used throughout.
- Quiet, long-lived operation, efficient fan selections, moderate tip speeds and outlet velocities, oversize bearings and shafts.
- Sectional construction; Door-way-sized sections permits easy building access.
- KENNARD "Penta-Post" construction of frame members allows maximum number of access and service panels.
- Counter flow of the air and water spray and complete intermixing of the two over the generous wetted deck surface.
- Indoor or Outdoor.

Representatives in All Principal Cities



Johnson waxes enthusiastic about GUSTIN-BACON SNAP*ON

In the strikingly modern plant of the Johnson Wax Company in Racine, Wisconsin, molten wax flows through an extensive maze of piping. Steam tracers coil about the piping to keep these waxes fluid, and of course, insulation is a "must".

To insulate this piping, the Johnson Company selected lightweight G-B Snap*On, the one-piece molded pipe insulation of fine glass fibers. The fact that Snap*On is reusable was important to the company, since piping is frequently changed around to accommodate new processes. Johnson people were equally pleased with the ease of application and the snug fit of Snap*On over steam traced lines. And Snap*On's thermal efficiency — highest of any pipe insulation on the market — was still another deciding factor.

Because it is an all-purpose pipe insulation, Snap*On, with a vapor barrier jacket, was also selected to insulate chilled water lines in the Johnson plant. Snap*On is available in a wide range of pipe sizes up to 33", in a variety of wall thicknesses and jackets. If you, too, are looking for a new and better way to insulate cold or heated piping where temperatures do not exceed 350° F, write for the full story, on Snap*On . . . today!

GUSTIN-BACON *Manufacturing Company* GUSTIN gb BACON

Thermal and acoustical glass fiber insulations • Pipe coverings and fittings • Molded glass fiber pipe insulation

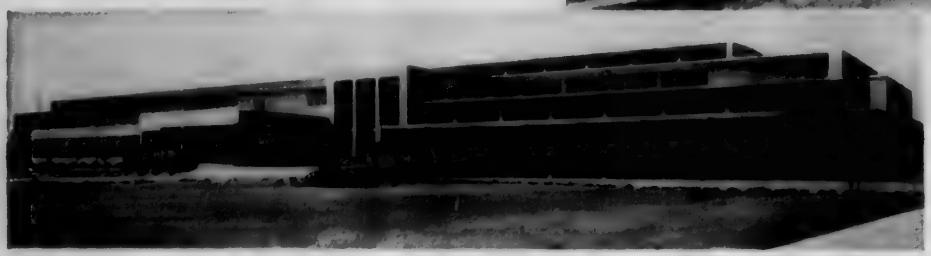
222 W. 10TH ST., KANSAS CITY, MO.

North, East, South, West, radiant heating does it best!

Beautiful, radiant-heated Paramus (N.J.) Memorial School

Modern Lakeview School, Vass, N. Carolina is, naturally radiant heated

Washington-Douglass Elementary School, Jackson, Tenn., modern as its radiant heating



Attractive radiant-heated Rosemead High School, Los Angeles, Calif.

We may be amused by the overworked expression, "from the rock-bound coast of Maine to the sun-kissed shores of California" . . . but that phrase well describes the sweep of the school-design revolution that is obvious everywhere.

Pride of our land, the magnificent schools are a credit to our national maturity and are receiving more specialized attention than perhaps any other type of building. Common sense, not indulgence, indicates that facilities that protect the health and well-being of students also promote the feeding of their minds.

Thus, among the considerations of lighting, ventilation, sanitation, recreation and heating, *radiant* heating is widely adopted as one of the most healthful. Its gentle, all-permeating, sun-like warmth . . . free from drafts, dust-laden currents and hot or cold spots . . . is ideal. Other advantages include concealed heating sources that thwart vandalism, promote safety, save floor and wall space and improve classroom appearance. Yes, from auditorium to gymnasium, from office to classroom, radiant heating "does it best."

And *steel pipe* also *does it best* as the heat transmission medium . . . proved in more than 60 years of conventional hot water and steam heating applications. In fact, *steel pipe* is the most widely used pipe in the world for heating, plumbing, snow melting, fire sprinkler systems and the transmission of power, steam and air.

Send for free 48 page color booklet "Radiant Panel Heating with Steel Pipe" and 32 page companion booklet "Steel Pipe Snow Melting and Ice Removal Systems."

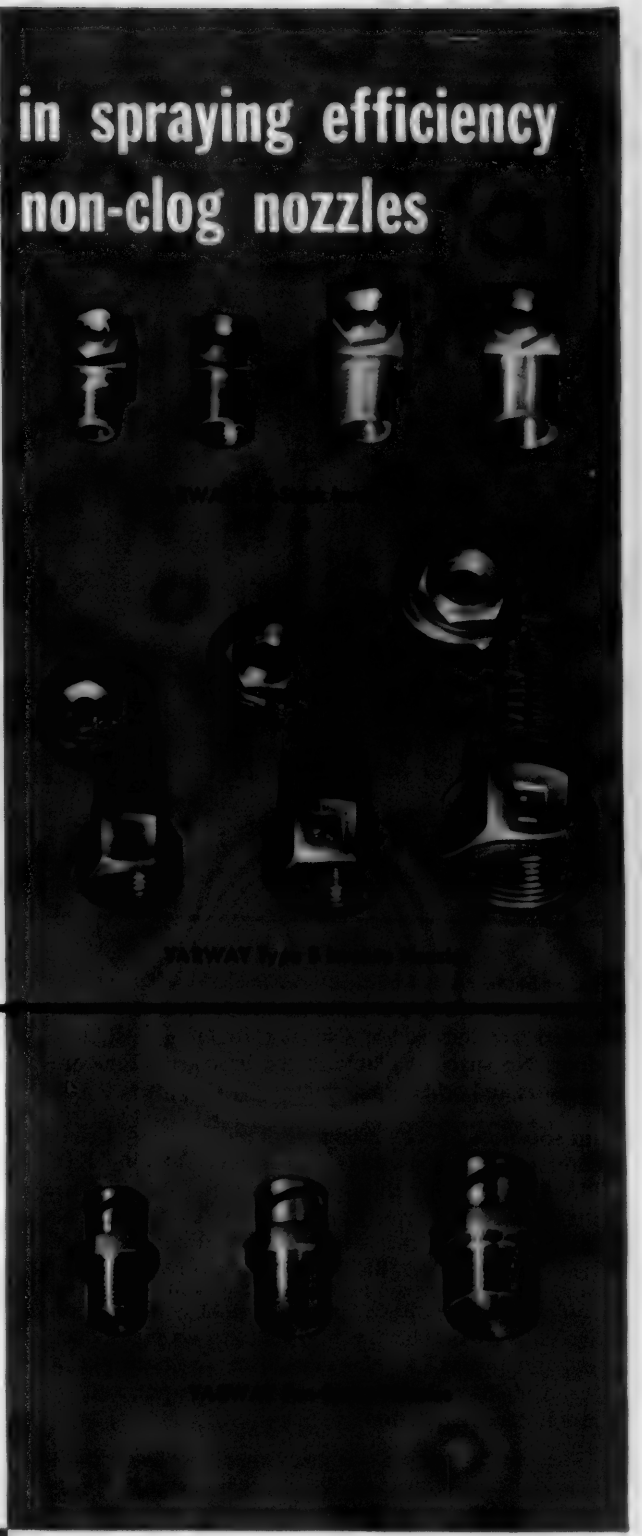
Typical classroom radiant-heating installation

Steel Pipe is First Choice

Committee on
STEEL PIPE RESEARCH
AMERICAN IRON AND STEEL INSTITUTE
350 FIFTH AVENUE, NEW YORK 1, N.Y.

reach a new peak with YARWAY

in spraying efficiency non-clog nozzles



cone spray

Most popular design for cooling, recooling, washing, rinsing, air conditioning, drying and other spraying operations in industrial and processing work and in power plants.

Non-clog involute design has no internal parts (vanes or deflecting plates) on which foreign particles can collect. Special contour of nozzle body guides flow with minimum loss of energy towards discharge opening, where liquid attains maximum velocity and leaves nozzle in a fine hollow-cone spray.

Available in three types:

Bar-stock bronze (shown) for fine spray
Sizes ¼" and ⅜", male or female connection
Capacities up to 3 gpm; pressures 20 to 50 psi

Cast bronze Type B (shown) for air conditioning and small recooling systems
Five sizes, ½" to 1½"
Capacities up to 40 gpm; pressures 7 to 25 psi

Cast bronze Type C (not shown) for spray pond service
Sizes 2" and 2½"
Capacities up to 110 gpm; pressures 7 to 15 psi

Write for YARWAY Spray Nozzle Book N-617; it gives capacities, dimensions and application information.

fan spray

Preferred for many washing and cooling operations. Non-clog design, delivers flat fan-shaped sheet of spray with slicing action particularly desirable for surface washing.

Thin sheet of spray is discharged forward 30° from the vertical, spreading in fan shape up to 140°, depending on operating pressure.

Made of bronze, steel or other bar-stock metals, male thread, six sizes ⅛" to 1", capacities up to 7 gpm, pressures up to 50 psi.

Write for YARWAY Spray Nozzle Book N-617.

YARNALL-WARING COMPANY
104 Mermaid Avenue, Philadelphia 18, Pa.
BRANCH OFFICES IN PRINCIPAL CITIES

YARWAY spray nozzles

HOW WOULD YOU AIR CONDITION THE CHRYSLER BUILDING?

THE PROBLEM: Air condition over 650,000 sq. ft. of area in the second highest building in the world. Cooling towers are located on Chrysler Building East, next door. No space available in the basements for compressors and other equipment.

THE SOLUTION: Specify 2200 tons of refrigeration. Locate compressors in basement of Chrysler Building East. Pipe chilled water through basements from Chrysler Building East. Provide a peripheral system for all floors from the 12th to the 30th. Serve all others by a conventional system (chilled water from central system).

It was a big job—it called for a "big" insulation. The choice was Fiberglas* Insulation—for pipes, ducts and equipment. As the consulting engineer put it, ". . . modern, lightweight, long life, vapor and rot proof, easy installation . . ."

Are you familiar with the many applications of versatile Fiberglas Insulations? Write for full data to: Owens-Corning Fiberglas Corp. Dept. 41-G, Toledo 1, Ohio.

Credits go to Cosentini Associates, Consulting Engineers; Turner Construction Co., General Contractors; Wolff and Munier, Inc., Mechanical Contractors; Richmond Asbestos Co., Insulation Contractors; Webb & Knapp, Inc. and Associate, Owners.

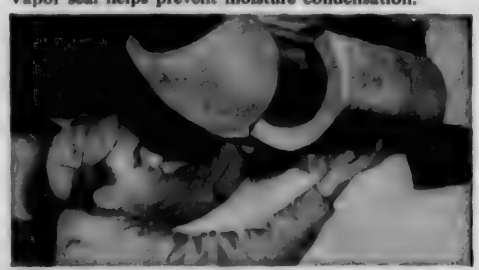
FIBERGLAS

makes good things better

. . . makes better things possible!

*Fiberglas is the trade-mark, Reg. U.S. Pat. Off. of Owens-Corning Fiberglas Corporation.

SECURING Fiberglas Vapor-Seal Duct Insulation to welded studs. Large, rigid boards handle and cut easily. Vapor seal helps prevent moisture condensation.

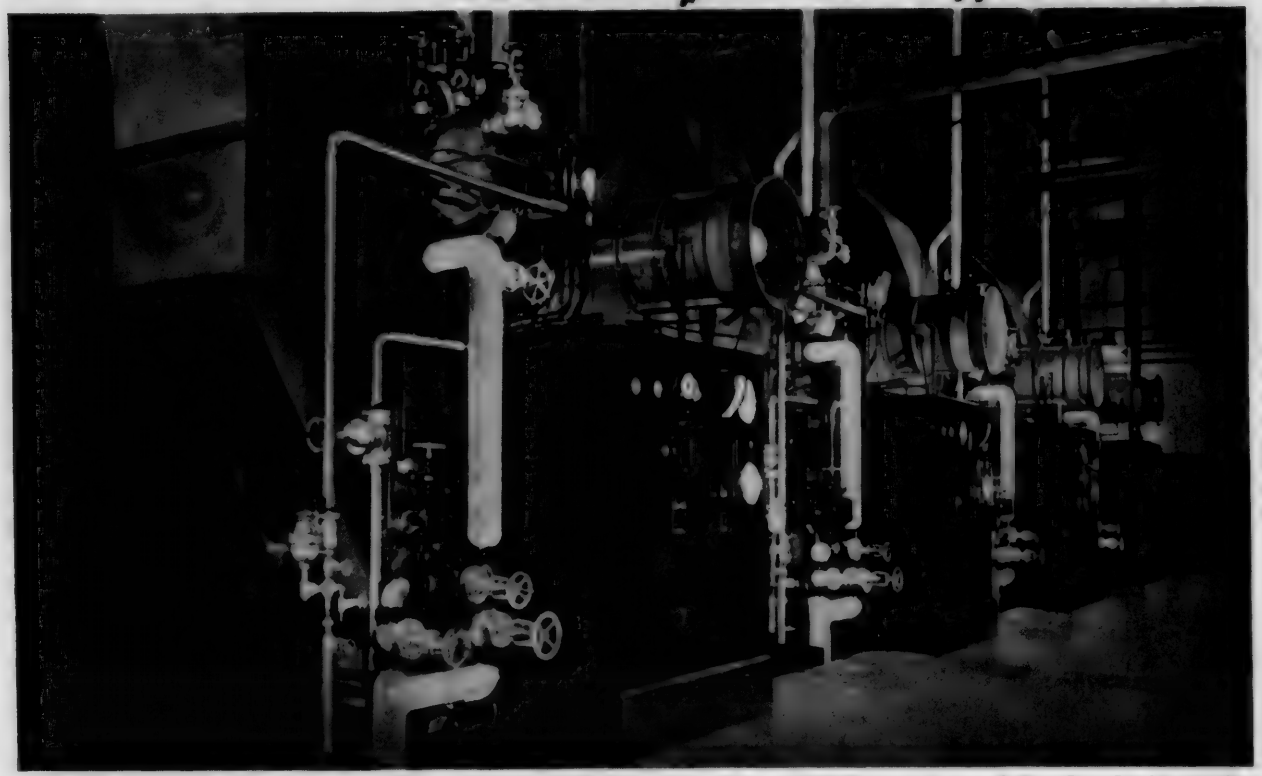


PLACING pre-formed Fiberglas Dual Temperature Pipe Insulations around chilled water pipe. Integral vapor barrier helps stop moisture. Note time-saving molded fitting around joint.

INSPECTING Foil-Faced Flexible Duct Insulation on ducts which will be later covered by ceiling. All Fiberglas Insulations are highly efficient (contain millions of heat-stopping air cells) and long lasting (will not rot).

keeping steam cheap . . .

THE YOUNGSTOWN SHEET AND TUBE COMPANY *installs* 4 B&W Type FM Boilers



Multiple-unit installation of B&W Integral-Furnace Boilers, Type FM, in operation at the expanded Indiana Harbor Plant, supplying steam for processing operations and heating in the cold-reduction plant.

When The Youngstown Sheet and Tube Co. decided to extend its existing Indiana Harbor Plant at East Chicago, Ind., it made a choice between the installation of large or small boilers to meet the increased demand for steam.

Impressed by the compactness as well as the relative cost per pound of steam, company engineers selected four B&W Type FM Units—leaving space for a fifth unit—rather than two larger boilers, and, as a result, effected substantial savings in both installation and operation. Placed in service in November 1953, each boiler is oil-fired and has a steam capacity of 28,000 lb per hr. The four units are being operated in conjunction with three older B&W Boilers of greater capacities, to produce steam for both plant processing and heating.

The already large and growing acceptance of the B&W Type FM Boiler for a wide variety of industrial, commercial, institutional, and other applications rests on a solid record of service satisfaction . . . is reflected by the number of units now in service or on order, having a total steam capacity of over 11,000,000 lb per hr. Ideal for small to medium-sized plants, the FM Boiler is often selected even for larger installations—as at The Youngstown Sheet and Tube—to assure efficient, economical operation while avoiding the complete field erection and close operating supervision required by big boilers. It is available in standard sizes to 40,000 lb of steam per hr at pressures to 235 psi. Many are in service at higher pressures and with moderate superheat.

The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

G-664-A

COST-SAVING FEATURES

- Saves Erection Time and Cost
- Meets Wide Range of Service
- Handles Quick Load Changes
- Fast Steaming
- Low Maintenance
- Easy Accessibility
- Suitable for Outdoor Service
- Burns Oil and/or Gas
- Saves Fuel
- Saves Space
- Safe, Automatic Operation

BOILER DIVISION

BABCOCK & WILCOX

L·O·F Glass Fibers Company unites two strong manufacturers ...benefits customers 4 ways

On March 1, two progressive producers of quality glass fiber products united their five plants, their extensive research facilities and their sales-service forces.

The merger—of first-rate importance to every company using glass fiber products—brings into one strong progress-minded organization:

—the combined **Fiber·Glass** and **Corrulux Divisions** of the Libbey·Owens·Ford Glass Company, and...

—**Glass Fibers Inc.** They now become...

—**L:O·F Glass Fibers Company.**

To all users of glass fiber products, this alert and co-operative new organization assures these immediate benefits:

1. *Unsurpassed quality in glass fibers*: Longer, finer, more uniform glass fibers result from the company's exclusive "Electronic-Extrusion" process. These longer, finer fibers assure more efficient insulation; more uniform yarns; stronger reinforcement.

2. *A widely diversified line* of improved glass fiber products: Thermal and acoustical insulation; textile yarns; underground pipe wraps; Q-felt high-temperature insulation; plastic reinforcement and translucent building panels.

3. *Five plants, strategically located* for dependable delivery to meet inventory and production demands of all users.

4. *National coverage* by a force of carefully selected distributors assures conscientious service in all local areas. These independent businessmen can handle your requirements for glass fiber products; advise you on applications.

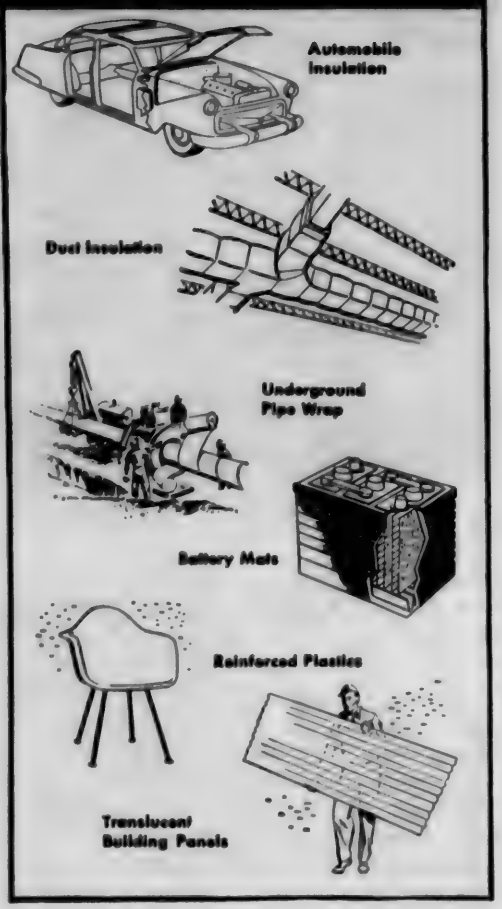
For additional information, contact your nearest L·O·F Glass Fibers office, or write: L·O·F Glass Fibers Company, Dept. 63-75, 1810 Madison Avenue, Toledo 1, Ohio.

L·O·F GLASS FIBERS

L·O·F GLASS FIBERS COMPANY
TOLEDO 1, OHIO

Makers of longer, finer glass fibers by the exclusive "Electronic-Extrusion" process.

TYPICAL BASIC APPLICATIONS OF L·O·F GLASS FIBERS' PRODUCTS



L·O·F GLASS FIBERS' PRODUCTS INCLUDE:

Super-Fine and Microlite Thermal and Acoustical Insulation • Microlite Acoustical Baffles • Microlite Hull Board • L·O·F Glass Fibers' and Vitron Textile Yarns • L·O·F Galvanized and Chrome Roving, Even-Tension Roving, Chopped Strand • Quartz Micro-Fibers • Microflex and Super-Fine High-Density Compressed Board • Industrial Mat • Blue Flag Underground Pipe Wrap, Duramat Pipeline Outer Wrap, Duramesh Pipeline Fabric, Duratape Pipe and Joint Wrap • Corrulux Translucent Structural Panels

A CHALLENGE!

THE STRONGEST MADE BY ANY GALVANIZED SHEET:

can be made of

WHEELING

SOFTITE®

galvanized sheets

- Take all the ideal working qualities you have ever hoped for in a galvanized sheet . . . put them all together and you'll get some idea of the amazing workability of Wheeling SOFTITE Galvanized Sheets.

  Here is a soft, ductile sheet, with the tightest zinc coating yet produced . . . so tight, in fact, that you can use Wheeling SOFTITE to make anything you make of steel sheets.

  If *you've* been having difficulty using customary galvanized sheets, try Wheeling SOFTITE. So many users have acclaimed it the ideal galvanized sheet that Wheeling is tripling its SOFTITE production facilities in 1955.

  Get details today. Call or write the Wheeling sales office nearest you. Wheeling Steel Corporation, Wheeling, West Virginia.

IT'S WHEELING STEEL

DISTRICT SALES OFFICES

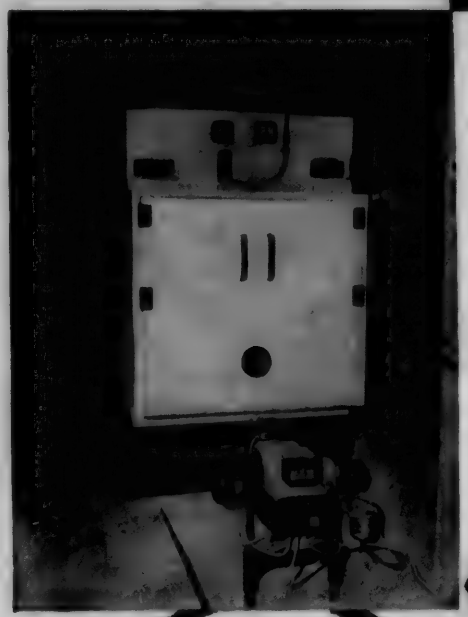
ATLANTA BOSTON BUFFALO CHICAGO CINCINNATI CLEVELAND DETROIT
HOUSTON NEW YORK PHILADELPHIA ST. LOUIS SAN FRANCISCO WHEELING

PROBLEM:

replacing boiler through narrow door opening

SOLUTION:

Portmar Type "C" split construction boiler



WOBURN PUBLIC LIBRARY, WOBURN, MASS.

HEATING CONTRACTOR: BUTLER ENGINEERING, WOBURN, MASS.

This dignified New England library, built more than 100 years ago, had the problem of installing a new heating boiler without going into costly alterations. Installing a one piece construction boiler would have meant chopping the existing doorway and removing many structural beams, resulting in considerable alteration and expense to the installing contractor.

The Portmar Type "C" was the answer. Installed without loss of time, since no alterations were required, the Type "C" was delivered in two watertight sections, requiring no welding in the field. Correctly specified for easy entrance into the building and for quick hookup to the radiation, it was rigged right at the breaching on the job with return and feed headers supplied—ready to start piping at minimum expense!

The Woburn Library is only one example of how Portmar Boilers solve special problems with outstanding success. Portmar Type "C" Boilers have been installed in schools, factories, hotels, hospitals, office buildings, apartment houses across the country, solving other alteration problems with similar success.

The Portmar Type "C" boiler met the full heating requirements and domestic water load of the Woburn Library. Because of its low waterline, low header connections and compact size, the Portmar Type "C" resulted in a fast, economical, efficient replacement.

Portmar modern heating systems economically deliver steady steam and abundant year-round hot water—for automatic firing with gas, stoker or oil. There's a Portmar Boiler for every wet heat job . . . for the cottage or the housing project. *Contact your jobber or your local Portmar representative, or write direct for full details.*

STURDY SECTIONAL CONSTRUCTION

Requires no welding in the field. Simple, fast assembly is assured: just bolt up and install two watertight sections. The Type "C" is also available in one piece construction.

SBI

ASME Inspected and Stamped

FOR FAST SPOT DELIVERIES, stocking warehouses in: Philadelphia, Penn. • Watertown, Mass. • Chicago, Ill. • New York, N. Y.

PORTMAR ENGINEERED QUALITY STEEL BOILERS

ENGINEERED QUALITY STEEL BOILERS

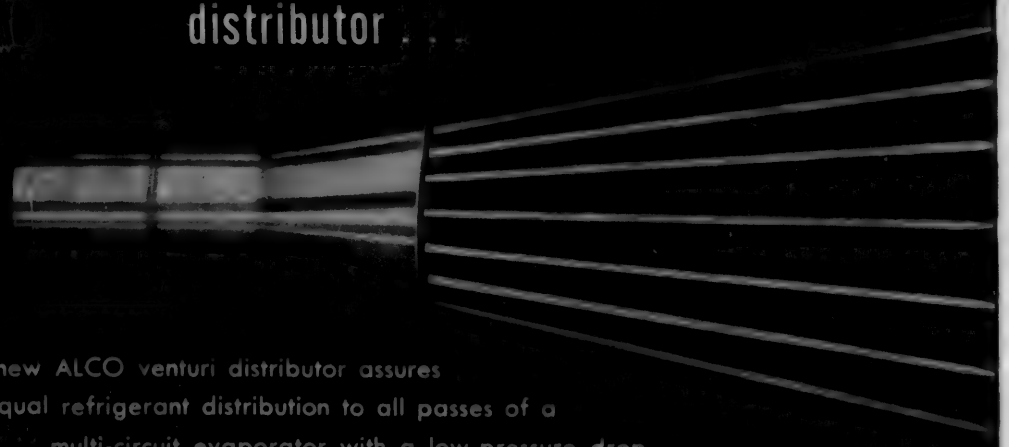
Portmar Boiler Company Inc.

193 SEVENTH STREET
BROOKLYN 15, N. Y.
TR•5•8777

RESIDENTIAL, COMMERCIAL, INDUSTRIAL WATER HEATERS AND HEATING BOILERS • VERTICAL, HORIZONTAL TUBULAR BOILERS • ROTARY FLAME BOILERS

AT LAST! what the industry has been waiting for!

ALCO'S NEW Venturi-Flo distributor . . .



The new ALCO venturi distributor assures equal refrigerant distribution to all passes of a multi-circuit evaporator with a low-pressure drop.

works in any position
vertical, upside-down or horizontal.

wide application range
from 25% of capacity to 150% of rated capacity . . . with only a small pressure drop at maximum conditions.

low-pressure drop
allows closer and more economical thermo-valve sizing.

one-piece construction
no nozzles for capacity regulation . . . nothing to take apart, nothing to come apart.

engineered—for service for life

write for section 188-55

ALCO VALVE CO.

859 KINGSLAND AVE. ST. LOUIS 5, MO.

How the Remotaire Heating-Cooling System reduced air conditioning installation and operating costs in this skyscraper

● American-Standard Remotaire room units, operating in conjunction with an interior ventilating system, keep the temperature just right in the new 1430 Broadway Building owned by M. Lowenstein & Sons, New York City. The Remotaire units heat, cool, filter and recirculate all the room air while a separate ventilating system brings fresh air into the room.

Installation costs are reduced because this efficient Remotaire System requires only a simple piping system, eliminates space-consuming risers, reduces bulky ductwork, and cuts down the size of the fan rooms.

Operating costs are substantially reduced due to the flexibility of this system to meet varying seasonal or use requirements. Several units or all units may be operated with equal efficiency.

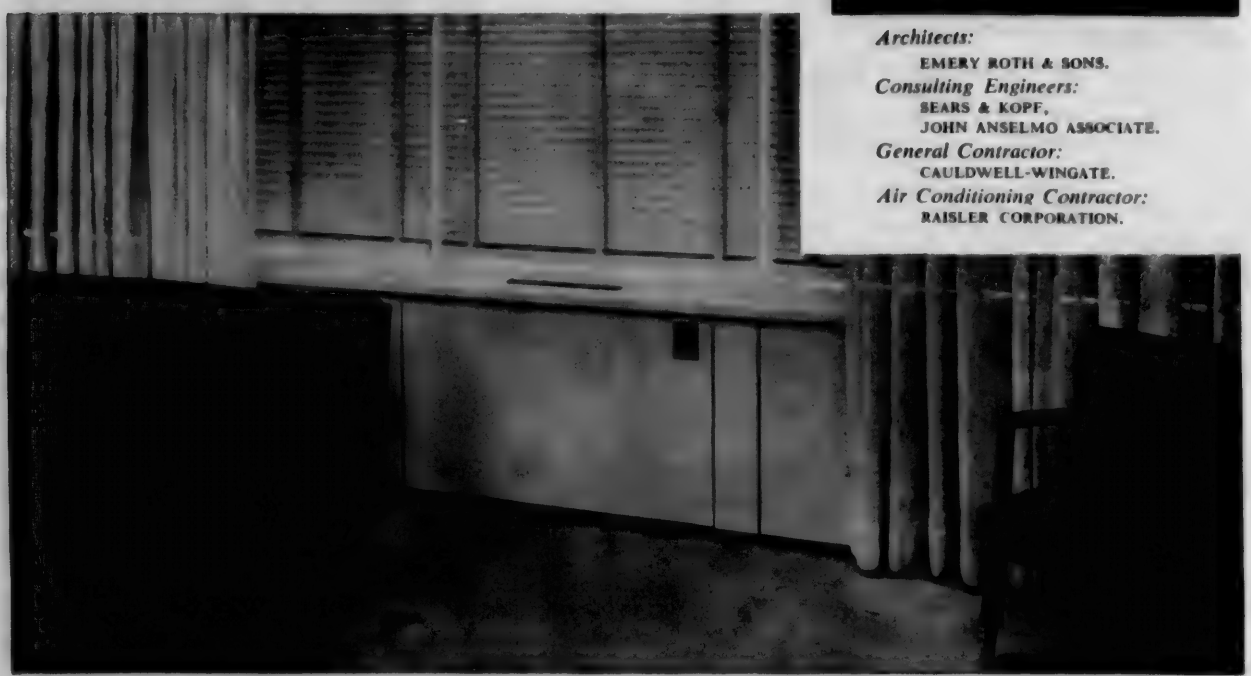
Remotaire Heating-Cooling Systems can be adapted to fit the needs of all types of buildings—old or new. Units come in a wide range of capacities and models to recirculate all the room air or to blend it with outside air. And Remotaire Systems take up little space because a simple piping circuit carries hot or chilled water from a centrally located boiler and water chiller to each individual room unit.

For more information about the complete Remotaire System — room conditioners, boilers and water chillers — call your American-Standard sales office or write to the Plumbing and Heating Division of American Radiator & Standard Sanitary Corporation, P. O. Box 1226, Pittsburgh 30, Pa.

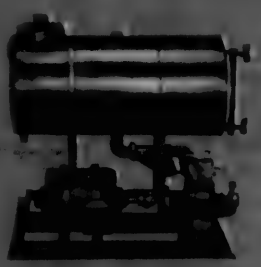
AMERICAN-Standard

WATER HEATING-COOLING SYSTEMS

Architects:
EMERY ROTH & SONS.
Consulting Engineers:
SEARS & KOPF,
JOHN ANSELMO ASSOCIATE.
General Contractor:
CAULDWELL-WINGATE.
Air Conditioning Contractor:
RAISLER CORPORATION.

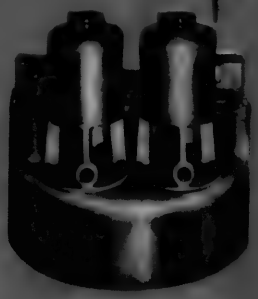


For greater operating efficiency, the 1003 Remotaire units in this 22-story building were divided into an interior zone, where the load is relatively stable and an exterior zone, where the load varies with outside conditions such as solar radiation. Temperatures can be individually controlled in all rooms equipped with Remotaire units.



"TM" TURBINE PUMP
Designed for boilers up to 250 hp and discharge pressures up to 150 lbs.

"SV" CONDENSATE PUMP
Capacities ranging from 2,000 to 40,000 sq. ft. EDR, and discharge pressures from 10 to 75 lbs.



"CV" VERTICAL PUMP
Heavy duty duplex unit with two float switches. Capacities ranging from 500 to 10,000 sq. ft. EDR and discharge pressures from 10 to 20 lbs.

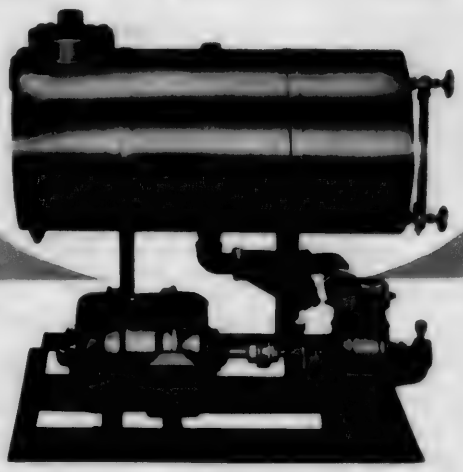
"CV" VERTICAL PUMP
Capacities ranging from 500 to 10,000 sq. ft. EDR and pressures from 10 to 20 lbs.

Skidmore Pumps

Designed to your specifications

—will out-perform standard types!

"HS" CONDENSATE PUMP
Capacities ranging from 1,000 to 65,000 sq. ft. EDR and discharge pressures from 10 to 75 lbs.



TYPE "TM"
SKIDMORE TURBINE PUMP

This unit is used for automatically supplying water to the boiler, when boiler water is lost through use of steam in processing plants. Designed for high pressure service—unit is completely assembled and mounted on either steel or cast iron base—pre-tested and ready for immediate shipment.

SEND FOR BULLETIN NO. 17

Write for bulletins or contact the nearest Skidmore representative for complete engineering data.

Skidmore has been Synonymous with Quality and Engineering Leadership, Since 1921.

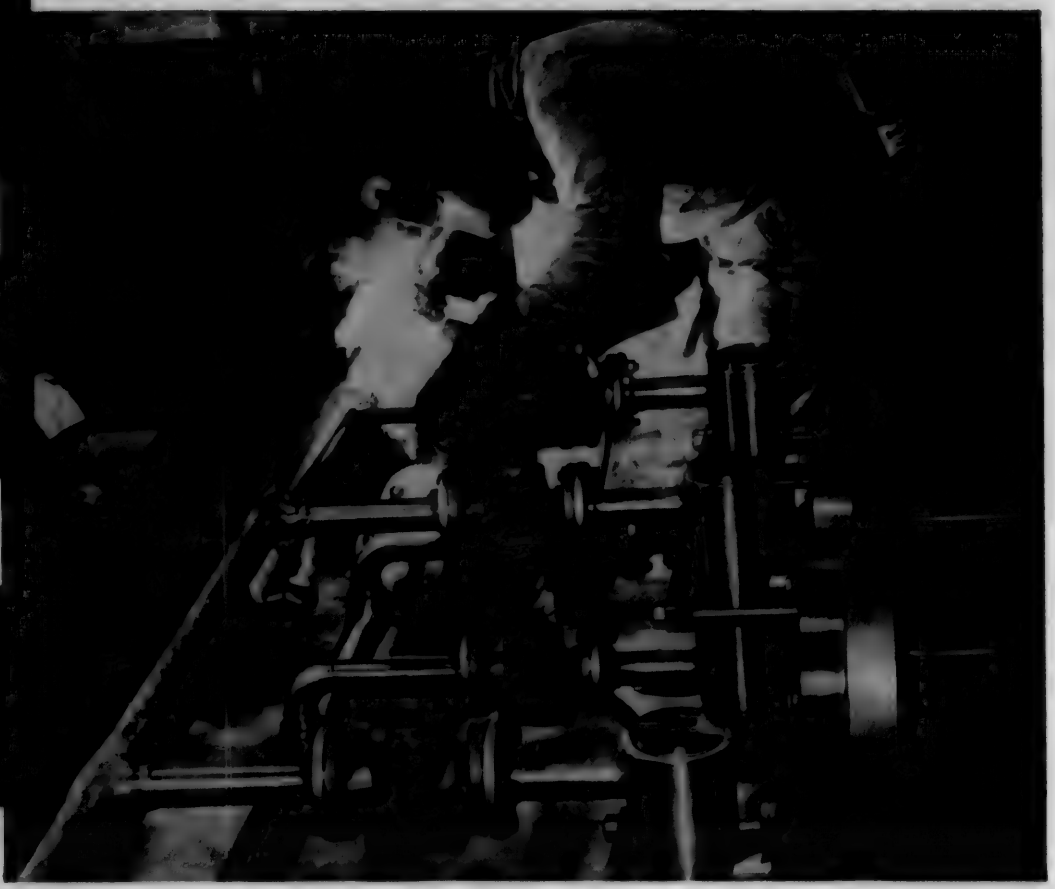
SKIDMORE PUMPS

SKIDMORE CORPORATION • ST. JOSEPH, MICHIGAN

WHY IT PAYS TO DO BUSINESS WITH THE LEADER

Tube Turns' nearby complete stock SAVES YOUR PURCHASING TIME

Tube Turns' pioneering research GIVES YOU ADVANCED PRODUCTS



Tube Turns' engineering help GIVES YOU COST-CUTTING IDEAS

In stainless steel or any other metal...

Your nearby TUBE TURNS' Distributor gives you *more for your money!*

You have a selection from the world's most complete line of welding fittings and flanges when you specify "TUBE-TURN"*. This leading line includes *stainless steel* fittings and flanges such as used in the acid-pumping station shown above . . . also alloys, non-ferrous metals and carbon steels . . . more than 4000 items to match *your* needs. To save purchasing time, put all your requirements on *one order* and call your *nearby* Tube Turns' Distributor for quick delivery and good service!

*"TUBE-TURN" and "U" Reg. U.S. Pat. Off.

TUBE TURNS LOUISVILLE 1, KENTUCKY

A Division of National Cylinder Gas Company

DISTRICT OFFICES: New York • Philadelphia • Pittsburgh • Cleveland • Detroit • Chicago • Kansas City • Denver Los Angeles • San Francisco • Seattle • Atlanta • Tulsa • Houston • Dallas • Midland, Texas

TUBE-TURN

Why Arizona Public Service chose Triple-Zone Gilsulate to protect 1200-foot fuel and steam lines

Sought lifetime protection against heat loss and corrosion

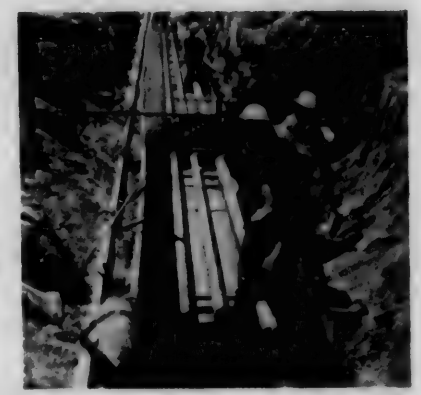
For its new Saguaro steam electric station near Red Rock, Arizona, the Arizona Public Service Company investigated several types of hot underground pipe insulation. The pipe system consists of three seamless carbon steel hot fuel and steam lines, totalling 1,200 feet, with welded joints running side by side between a 55,000-bbl. fuel oil storage tank and two 950,000 pound/hour steam generators.

Arizona Public Service Company found that GILSULATE gave the quickest, simplest and most economical system of insulation for its underground hot fuel and steam lines. Approximately 40 tons of GILSULATE were poured and tamped by 10 laborers in two 8-hour shifts — far less time and less expense than required for the other types of insulation investigated.

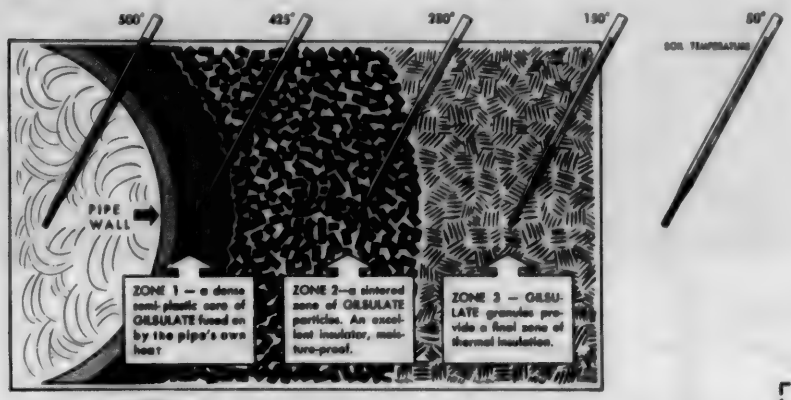
This is the experience of hundreds of other installations — *Triple-Zone GILSULATE shows the lowest cost per installed linear foot of any hot underground pipe insulation!*

Facts about Gilsulate

1. *Easy to use*—just pour, tamp and backfill...pipe heat does the rest.
2. *Forms 3 zones of protection* against heat loss and all commonly encountered hazards to hot buried pipes.
3. *Needs no sleeves* or mechanical sheaths: no mixing or special handling.
4. *Needs only* normal pipe spacing: for multiple pipe or cramped conditions.
5. *3 types* for varying temperature ranges up to 520° F.



Lines include five horizontal expansion U-bends. A 6-in. fuel oil supply line, a 4-in. fuel oil return, and a 4-in. saturated steam line leading to the fuel oil tank heater were placed side by side in a 37-in. wide trench, and covered with GILSULATE. After light tamping of GILSULATE, trench was backfilled—and the work was done.


560°
425°
280°
150°
80°
SOIL TEMPERATURE
PIPE WALL
ZONE 1 — a dense semi-plastic core of GILSULATE fused on by the pipe's own heat
ZONE 2—a sintered zone of GILSULATE particles. An excellent insulator, moisture-proof.
ZONE 3 — GILSULATE granules provide a final zone of thermal insulation.

THE TRIPLE-ZONE INSULATION FOR LIFETIME PROTECTION OF HOT UNDERGROUND PIPES

GILSULATE®

AMERICAN GILSONITE COMPANY, SALT LAKE CITY 1, UTAH
Affiliate of Barber Oil Corp. & Standard Oil Co. of California

American Gilsonite Co.
134-A West Broadway, Salt Lake City 1, Utah — or — 1145 East Jersey St., Elizabeth, N. J.

Send me more information on GILSULATE Insulation

NAME .....

TITLE .....

COMPANY .....

ADDRESS .....

AHV

FOR *Fabulous* FONTAINEBLEAU

Miami Beach's new $15,000,000 Fontainebleau Hotel depends on Chase Copper Tube and Fittings for entire plumbing and air conditioning systems!

Luxury and practical utility are perfectly combined at the Fontainebleau! Everything is top quality—so Chase Copper Tube and Fittings were chosen for the plumbing and air conditioning systems!

Using Chase Copper Tube and Fittings pays off in top-performing, longer-lasting systems that add extra value to any home or building. Such systems, too, cost *little or no more* than ones of ordinary rustable materials! That's because Chase copper tube and fittings can be installed faster—substantially reducing installation costs! Use Chase copper tube and fittings on your next job!

Here's how the mechanical contractors sum up their reasons for using Chase materials:

"We have been using Chase Brass and Copper for many years. Chase has always maintained the highest quality in their industry. Their quality along with their excellent service to customers is a combination that makes Chase superior."

—MARKOWITZ BROS., INC., MIAMI, FLA.

IT'S 100% CHASE COPPER TUBE!

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MECHANICAL ENGINEERS:
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MECHANICAL CONTRACTORS:
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WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

The Nation's Headquarters for Brass & Copper

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Baltimore	Cleveland	Houston	Minneapolis	Pittsburgh	Seattle
Boston	Dallas	Indianapolis	Newark	Providence	Waterbury
Charlotte†	Denver	Kansas City, Mo.	New Orleans	Rochester†	(†sales office only)

JOHNSON CONTROL at NORTHLAND Insures

Expert opinion rates Detroit's remarkable Northland Center as not only the largest of all shopping centers, but as the most nearly perfect in providing *total* comfort and convenience for its patrons.

The comfort *control* problems involved here are particularly interesting. The year 'round air conditioning system involves 72 air handling units in the six buildings. For economy, a central plant supplies all steam and chilled water.

The *number* and *sizes* of the individual stores are important considerations. The 90 tenant stores range upwards in area from a few hundred to tens of thousands of square feet. Comfort requirements also differ by *types* of stores—nearly every kind of retailing operation is represented at Northland!

Occupancy levels change throughout the day. An average of 45,000 people shop here daily. Peak traffic reaches 68,000. Other variables include *outdoor temperatures, wind, exposure* and *large glass areas.*

To solve these and similar comfort control problems correctly, Northland Center depends on a comprehensive system of Johnson Automatic Temperature Control. Johnson engineers designed an up-to-the-minute control system that provides *ideal temperatures in every sales area in every store at Northland.* It insures tenant satisfaction and caters to customer comfort. And, equally important, the superior economy features of Johnson Control make it possible to accomplish all this at the *lowest possible* operating cost.

Next time you have a temperature control problem, give yourself the benefits of this kind of modern temperature control engineering skill. Whether it's a shopping center, store, office building, school, hotel, hospital or factory, a nearby Johnson engineer is ready with the best answer. JOHNSON SERVICE COMPANY, Milwaukee 2, Wisconsin. Direct Branch Offices in Principal Cities.

JOHNSON CONTROL

TEMPERATURE AIR CONDITIONING

PLANNING • MANUFACTURING • INSTALLING • SINCE 1885

Appealing displays and assured comfort tempt customers to Hudson's Basement Store. More than 300 Johnson Thermostats at key locations in Hudson's and the 90 other stores respond to the slightest demand for more or less heating or cooling.

Conditioned air for small tenant shops is supplied by multi-zone air handling units. A single unit may handle 2, 4, 6 or 8 shops. Each shop has individual temperature control. Entrance heaters are also controlled.

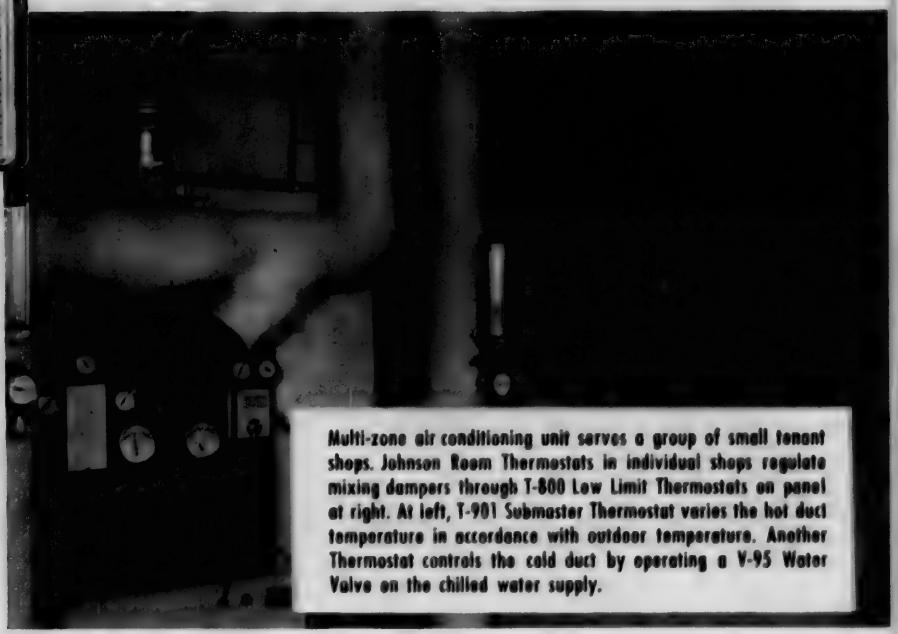
Larger tenant spaces have separate air handling units and controls. Solving the great variety of control requirements at Northland is an excellent example of the flexibility of Johnson Control.

Northland Regional Shopping Center, Detroit, Michigan. Architect: Victor Gruen Associated Architects & Engineers, Inc. Consulting mechanical engineer: H. E. Beyster & Associates, Inc. Heating contractor: The Donald Miller Co. Air conditioning contractor: Carrier Corporation.

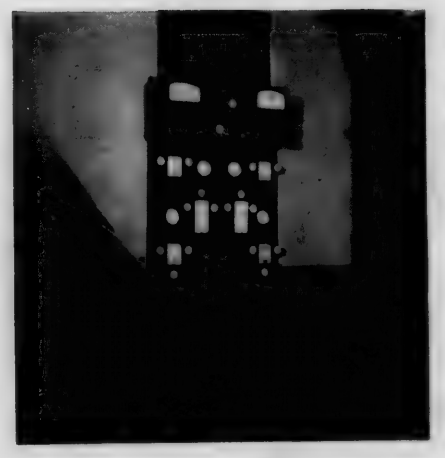
NORTHLAND HIGHLIGHTS. World's largest shopping center. Includes The J. L. Hudson Co. Department Store (over 470,000 sq. ft.) and 90 shops in 5 other tenant buildings (over 525,000 sq. ft.). Hudson store is the largest built in over 25 years. Center is completely air conditioned, with 3,600 ton central refrigeration plant and 900 hp central steam plant. Store frontage totals 1¼ miles. In Hudson's alone, there are nearly 10 miles of heating, ventilating and air conditioning ducts.

Ideal Temperatures for 45,000 Shoppers a Day!

READ HOW THIS JOHNSON-ENGINEERED CONTROL SYSTEM PROVIDES MADE-TO-ORDER WEATHER FOR EACH OF 90 STORES . . . HELPS LARGEST SHOPPING CENTER GET THE ECONOMIES OF CENTRAL STEAM AND REFRIGERATION PLANTS



Multi-zone air conditioning unit serves a group of small tenant shops. Johnson Room Thermostats in individual shops regulate mixing dampers through T-800 Low Limit Thermostats on panel at right. At left, T-901 Submaster Thermostat varies the hot duct temperature in accordance with outdoor temperature. Another Thermostat controls the cold duct by operating a V-95 Water Valve on the chilled water supply.



Panel mounted controls for twin air handling units in the Hudson store. On each unit a Johnson Submaster Thermostat controls a Steam Valve on the reheat coil to regulate final discharge temperature of conditioned air. Correct discharge temperature is determined by strategically located Room Thermostats that average sales area temperatures and pilot a Pressure Regulator which resets the Submaster Thermostat.

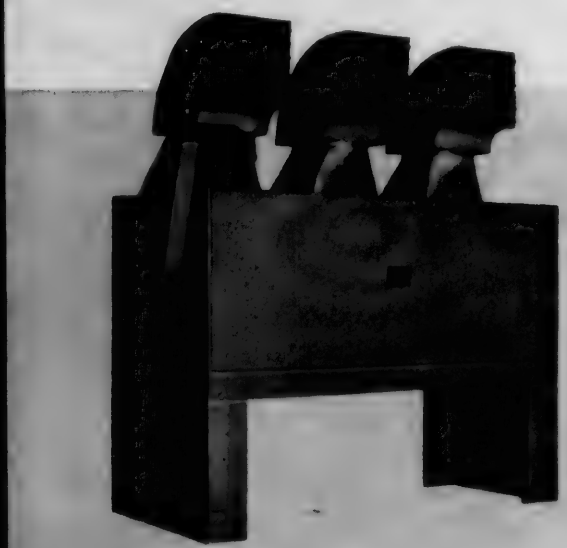
On adjoining units, powerful Johnson Damper Operators regulate Dampers on minimum and maximum outdoor air and return air as determined by Dew-point Thermostats. Another Thermostat on the unit at right acts as a Safety Thermostat on the Steam Valve. Hudson store is served by 18 large built-up units, 14 of which are installed in pairs as shown.

The new

in the Nesbitt line

- ★ Eight basic sizes, 24 models, 15,000 to 335,000 Btu/hr
- ★ Universal coil for maximum performance on steam or hot water
- ★ Coils made for high water capacities and temperature drops
- ★ Low water rates effect savings in piping and installation
- ★ Minimum air-flow resistance reduces noise and operating costs
- ★ Seamless copper tubes and bends; corrugated aluminum fins
- ★ Male pipe connections through casing rear save time and space
- ★ Balanced aluminum fans for quiet, large-volume air delivery
- ★ Heavy gauge, die-formed steel casings for modern interiors
- ★ Deep drawn air intake opening for maximum fan performance
- ★ Easily adjustable louvers, available with double deflectors
- ★ Green metallic hammered finish baked on bonderized steel

LITTLE GIANT UNIT HEATERS . . . Eight basic sizes, choices of heating element, 28,500 to 512,000 Btu/hr; three blow-through (down-blow) models, five draw-through (down- or horizontal-blow) models. Pub. 402.



GIANT UNIT HEATERS . . . Twelve basic sizes each with choice of ten heating elements, steam or hot water; one, two, or three fans; for large capacity heating and/or ventilating; four ways of mounting. Pub. 404.

whenever you have a heating or ventilating problem

propeller-fan heater

of industrial and commercial unit heaters . . .

This wholly new Nesbitt propeller-fan unit heater offers an unusual combination of values in construction, performance, appearance and cost.

Its *universal* heating coil of continuous tube design *performs equally well with either steam or hot water*—an innovation that cuts inventory and warehousing costs in half.

Exact selection is simplified by the choice of 24 models (eight basic sizes) with capacities ranging from 15,000 to 335,000 Btu/hr. Pub. 401.

A careful study of the partial list of special features on the opposite page is recommended. It will explain why these new units are extremely flexible in their application, easy to install, surpassing in performance, quiet, long-lived, economical, and fit for the finest interiors.

The advanced styling and performance of all Nesbitt Unit Heaters is the result of over forty years of progressive engineering and technical improvement—to help keep you in the lead.

SERIES C UNIT HEATERS . . . Five sizes, 34" to 74½" long, each with choice of two steam or one hot-water heating element; two to five fans; recess, semi-recess, and non-recess fronts; 35,100 to 148,000 Btu/hr. Pub. 403.

GAS-FIRED UNIT HEATERS . . . Seven models, 25,000 to 200,000 Btu/hr input, 400 to 2900 cfm; A.G.A. and U.L. approved for all gases; most advanced styling and many features to simplify installation. Pub. 280.

think first of this name

Nesbitt
INDUSTRIAL UNIT HEATERS
Manufactured by
John J. Nesbitt, Inc. Philadelphia 16, Pa.

How Honeywell Customized Temperature Control helps provide

The kind of "Indoor Weather" your clients need

Customized Temperature Control installation at Corning Glass Center is a good example.

AT THE Corning Glass Center in Corning, New York, you'll find a museum, offices, shops—and production areas where Steuben glassware is made.

Such a variety of functions under one roof calls for scientific temperature control—if the "indoor weather" is to be comfortable throughout the building.

Today the best way to provide proper "indoor weather"—whether a building houses one function or many—is through the use of *Honeywell Customized Temperature Control.*

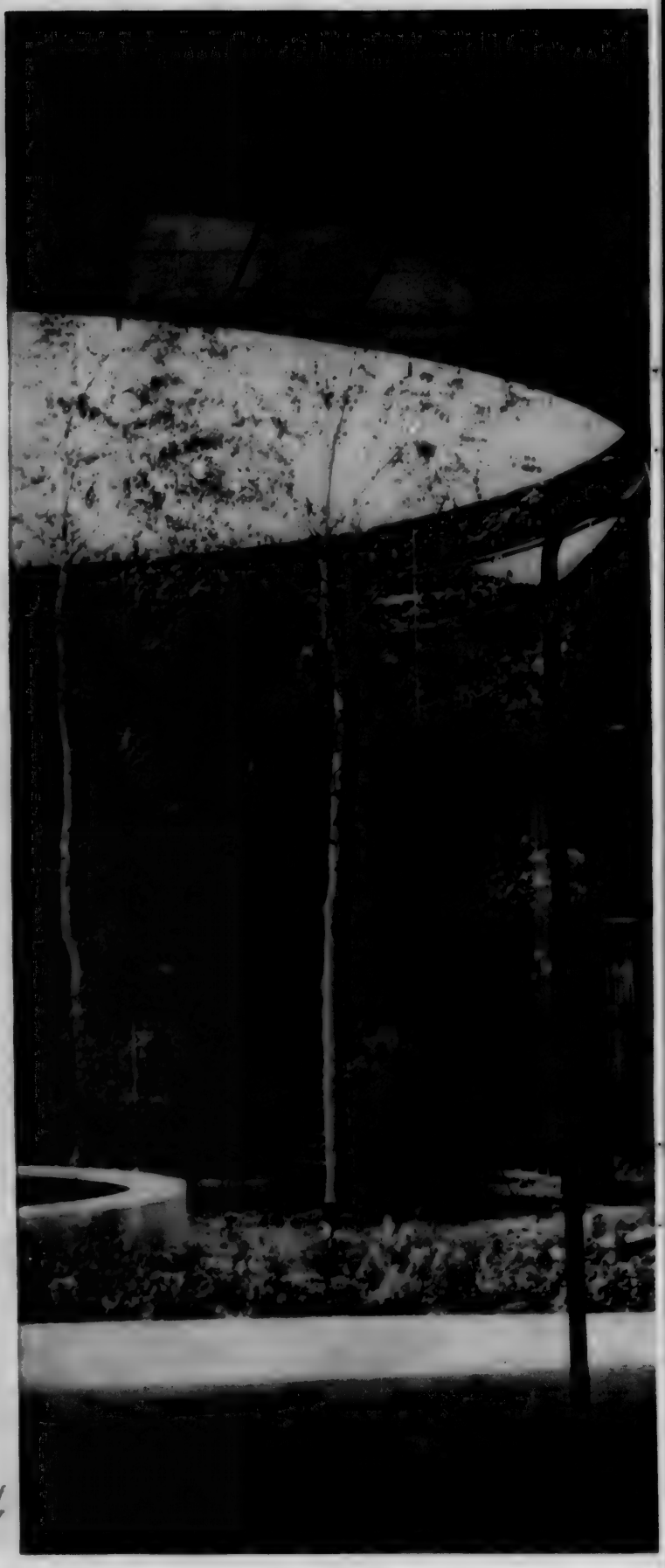
The key word here is "customized". It means that whatever your clients' control requirements, a Honeywell Customized Temperature Control installation *designed to fit the needs of the building and its occupants is your answer.* This applies not only to heating and cooling, ventilating and humidity control—but to industrial control as well.

Only Honeywell can provide true "customized" control. Because only Honeywell manufacturers all three types of controls—pneumatic, electric and electronic.

The story, in brief form, of the Honeywell Customized Temperature Control installation in the Corning Glass Center is told by the floor plan and picture captions you see here.

They tell how specific occupancy, use and exposure problems were met.

The *techniques* used, applied to your particular problems, can help you give your clients the "indoor weather" they've always wanted.

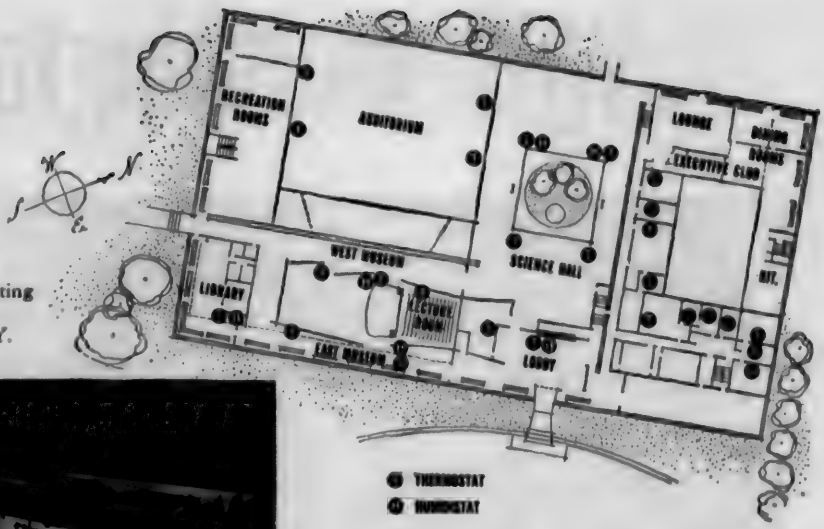


Interior garden of Corning Glass Center

Architects: Harrison & Abramovitz and Abbe, New York, N. Y.

Mechanical Consulting Engineers: Jaros, Baum & Bolles, New York, N. Y.

Air Conditioning Consulting Engineers: Henry Peck Associates, Fairport, N. Y.



This panorama of the Corning Glass Center shows the temperature control problems involved. Huge glass window areas face four directions. Whether it is sunny or cloudy makes a big difference to the heating and cooling system. But Honeywell Customized Temperature Control, using electronic and pneumatic thermostat and humidistats, keeps the building comfortable all the time.

Interior heating and cooling factors are important, too. Take the auditorium above, for instance. With a large crowd you have one heating problem. With a small group, quite another. But the four Honeywell thermostats located here handle either situation easily.

The internal heating problem in the display room above is somewhat similar to that of the auditorium. But when it is crowded (requiring little heat) the auditorium might need considerable heat. Yet with enough thermostats, strategically placed, both areas are comfortable.

For comfortable, more productive temperature in new or existing buildings—of any size—specify Honeywell Customized Temperature Control

Whether it's a factory, motel, hospital—or any building of any size—new or existing, Honeywell Customized Temperature Control can help meet your clients' heating, ventilating, air conditioning and industrial control problems. You can give your clients more comfort and efficiency. And they'll save fuel, too.

For full facts on Honeywell Customized Temperature Control and the economical Periodic Maintenance Plan, call your local Honeywell office. Or write Honeywell, Dept. HV-7-111, Minneapolis 8, Minnesota.

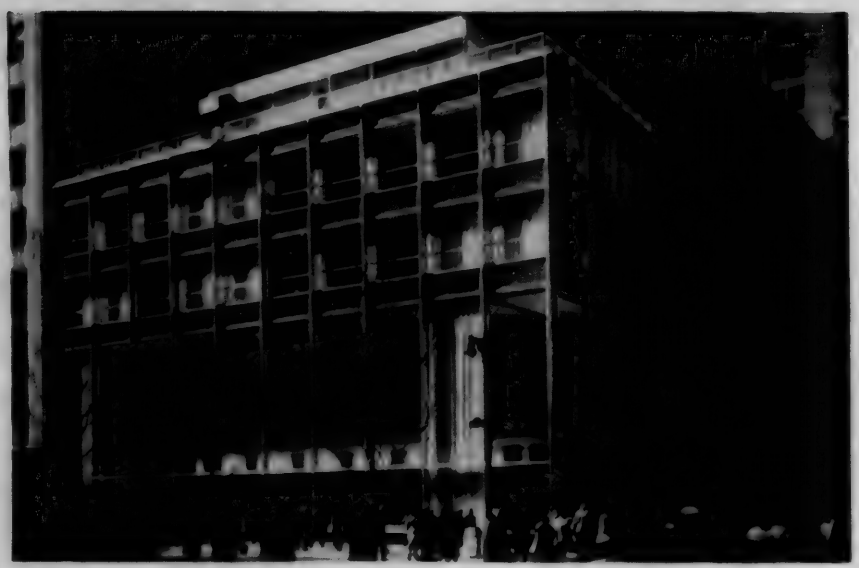
James M. Brown, III, director of the Corning Glass Center, says:

"Today our Glass Center is one of the most comfortable buildings in the country. Important in helping make possible this comfort is our Honeywell Customized Temperature Control installation."

MINNEAPOLIS
Honeywell
Customized Temperature Control

112 offices across the nation

WHY Worthington rates so



UNUSUAL DESIGN

Completely sheathed in glass, the new Manufacturers Trust Building in New York posed an unusual air conditioning problem. The job is taken in stride by a modern Worthington central station system consisting of two 150-ton packaged water chillers.

HEAVY TRAFFIC

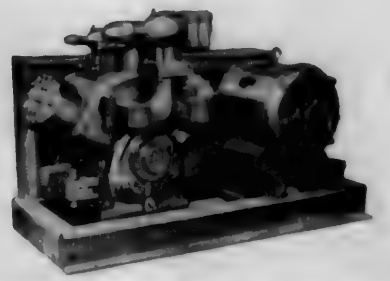
Keeping more than 12,000 people cool daily at New York City's new airlines terminal is a tough job. It's handled by a 315-ton Worthington centrifugal refrigeration system, together with Worthington air handling equipment and pumps.

HUMID HEAT

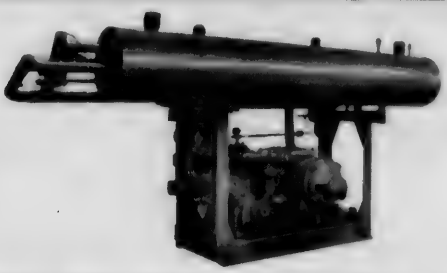
The Sterling, Miami Beach's newest oceanfront hotel, has *everything* but humid heat! An all-Worthington air conditioning system cools 142 rooms and 186,000 cubic feet of dining room and lobby space. Basic unit is a 60-ton Worthington "million-dollar" Freon compressor. Worthington packaged units are also spotted at key points.

many key air conditioning jobs

There are good reasons why unusual design, traffic or climate conditions can't trip up a Worthington dealer. He handles the most complete line of central station equipment in the industry. And, he's backed by Worthington's 70 years of specialized air conditioning experience. With assets like these, he's ready to take on *any* air conditioning job! For more details about the complete line, write Worthington Corporation, Air Conditioning and Refrigeration Division, Sect. A.5.57-V, Harrison, New Jersey.

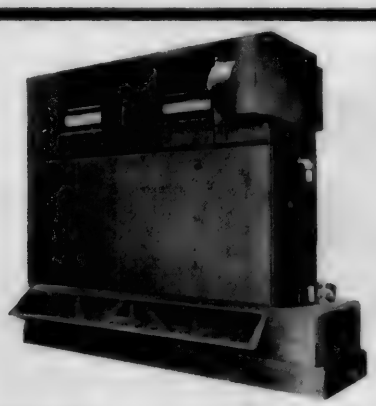


NEW FREON COMPRESSOR. Marked by sturdy construction and higher operating speeds, the new Freon compressor line ranges from 3-150 hp. Scientific balancing of rotating and reciprocating elements assures quiet, vibration-free operation.

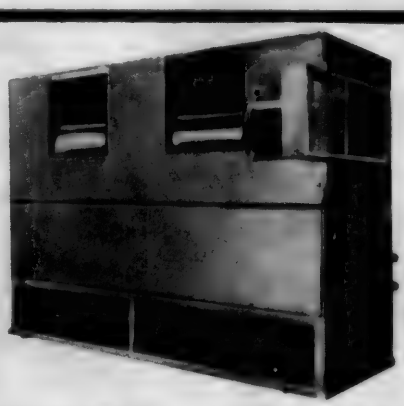


COMPACT LIQUID CHILLERS, in sizes up to 200 hp, provide dependable air conditioning where chilled water is used as the cooling medium. Factory assembled units show trim design; require minimum floor space. "Hearts" of these units are Worthington Freon Compressors.

INDUCTION CIRCULATOR. Room air conditioning unit operating on high-pressure air induction principle. Used for perimeter cooling and heating of multi-story buildings. Absence of moving parts means long life, quiet operation. 75 to 1000 CFM total air distribution.



EVAPORATIVE UNITS are designed for application where water is high in cost or temperature. Units reduce water consumption by 90% or more; do not require cooling towers. Can be adapted for indoor or outdoor use. Six sizes range from 10 to 150 tons.



AIR HANDLING UNITS for remote air conditioning. Cooling coils available for direct expansion Freon-12, Freon-22, or chilled water. Floor and ceiling mounted units are functionally designed for easy installation and operation. 1,400 to 13,500 CFM.

A 5 57

WORTHINGTON

CLIMATE ENGINEERS TO INDUSTRY, BUSINESS AND THE HOME

Guaranteed TO SHUT TIGHT*

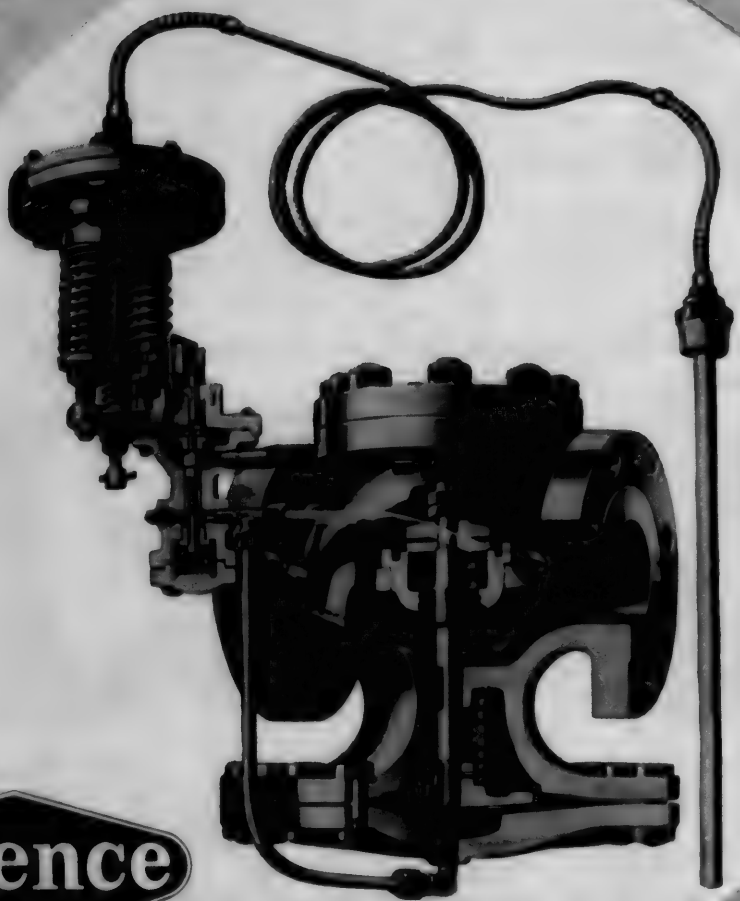
*When equipped with a SECO Metal Seat and Disc on steam service and protected by an approved Strainer, a Spence Regulator is guaranteed to shut tight when the demand for steam ceases.

Expensive steam leaks due to a lack of absolutely tight shutoff are eliminated in Spence Temperature Regulators. Here is why we can make such a guarantee:

First, our temperature regulators are of the single seat design. Seats and discs are made of durable SECO Metal. More than 20 years experience in thousands of installations has failed to produce a single case where SECO Metal has been cut by steam.

These plus other design features explain why Spence Temperature Regulators function dependably and accurately year after year without requiring expensive repairs or special attention.

Want more facts? Write for Bulletin T50 giving full details.



SPENCE
TYPE ET150
Temperature
Regulator

Spence

SPENCE ENGINEERING COMPANY, INC.
WALDEN, NEW YORK

The PROOF of a building's age is behind these doors!

Five seconds behind these doors, and you *know* your building's age!

Notice the plumbing fixtures. If they are off-the-floor . . . your building is new forever. If not . . . it is obsolete when the doors first open.

Off-the-floor fixtures installed today will never give away the age of your buildings. Year after year, they will continue to contribute to the desireability—and marketability—of your investment. They add spaciousness. They free washrooms of litter-traps and breeding grounds for bacteria. They do away with obstacles to easy cleaning and hospital-like sanitation.

In today's major buildings, more than 800,000 such fixtures are supported on the ZURN SYSTEM®. You should look into the reasons why. You will find, among other things, that Zurn-engineered, patented features simplify installation and alignment. The entire stress is on the Zurn fitting—not on the wall. And ZURN SYSTEMS never interfere with future alterations, but often make them easier.

Buildings age fast enough. Do not give yours a running start by designing washrooms that are obsolete when the doors first open.

Before planning your next building, be sure to write for the helpful new booklet, "Behind Closed Doors." It is your guide to modern, sanitary washroom decor. 110-1

The ZURN ZERO ZONE® is created by mounting off-the-floor plumbing fixtures on behind-the-wall ZURN SYSTEMS. This permits the highest degree of restroom sanitation to be attained and maintained. All major plumbing manufacturers make fixtures to fit the ZURN SYSTEM.

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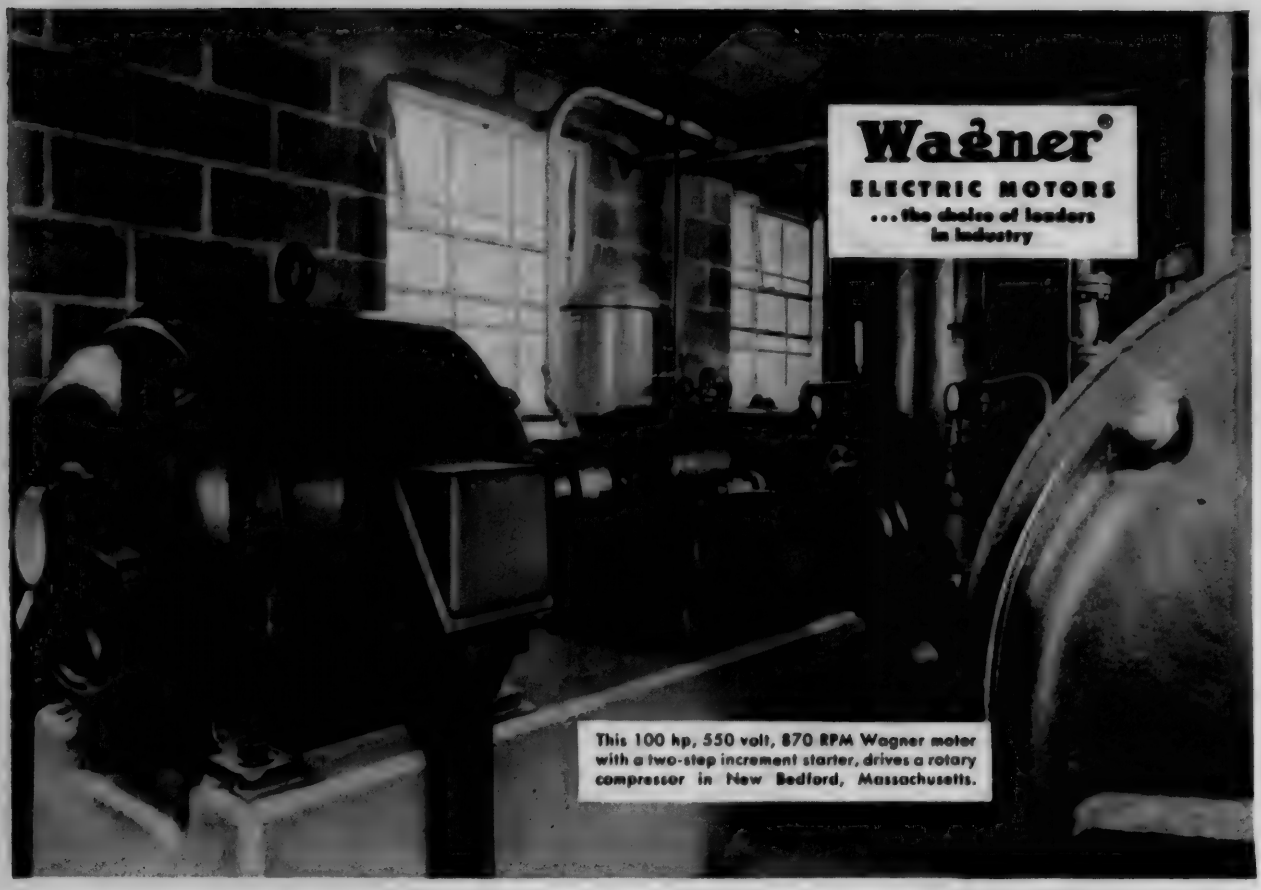
J. A. ZURN MFG. CO.

PLUMBING DIVISION

ERIE, PA., U. S. A.



This 100 hp, 550 volt, 870 RPM Wagner motor with a two-step increment starter, drives a rotary compressor in New Bedford, Massachusetts.

Start large polyphase motors with minimum line voltage disturbance

USE THE Wagner INCREMENT MOTOR AND STARTER COMBINATION

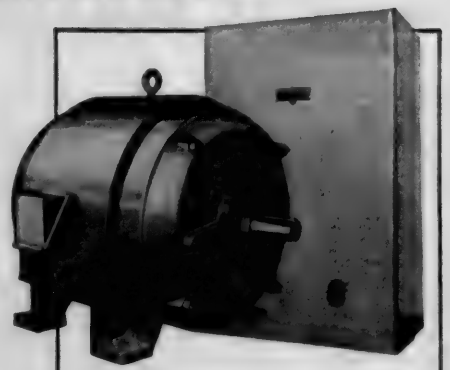
Here's a modern, economical, highly efficient way to start large polyphase motors — the Wagner Increment Motor and Starter "Package."

By reducing current drawn from the line on each point of the starter, the combination limits the inrush of motor current to values that are acceptable for the distribution systems of most power companies.

Voltage disturbances on the line are reduced because current taken from the line is not broken during the starting period—as it is when auto-transformers or compensator type starters are used.

Wagner two-step increment motor and starter combinations are suitable for most applications. For installations where unusually low inrush of starting current is desired, Wagner can furnish three-step and four-step increment starters.

Your nearby Wagner engineer will help you select the increment motor and starter combination that meets *your* requirement. Call the nearest of our 32 branch offices, or write us.



Type RP polyphase motor in ratings to 400 hp with increment type starter

Wagner Electric Corporation

6463 Plymouth Ave., St. Louis 14, Mo., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

M80-16

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

EXPANDED CHICAGO'S

Enlarged Line of

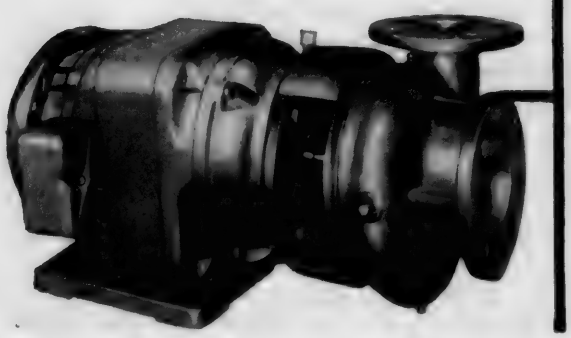
FC and CC Pumps

Gives You More Choices, More Efficiency

Designed for:

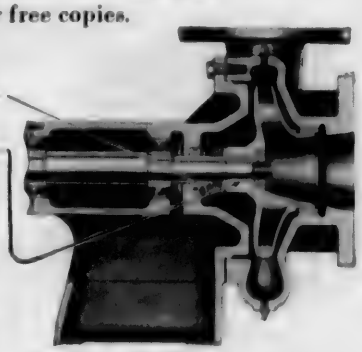
- Water Supply Systems
- Cooling Tower Circulating
- Air Conditioning Systems
- Hot and Chilled Water Circulating
- Pneumatic Water Systems
- Booster Service

However specialized your need for a circulating pump, you are sure to find the model and size that exactly fits your requirements in Chicago's recently expanded centrifugal pump line. Now you can get high efficiency Chicago pumps in either close-coupled or flexible-coupled models with capacities from 5 to 400 G.P.M. and for heads from 10 to 190 feet. Complete line is described in two new bulletins, Nos. 107 and 108. Write to Dept. D for free copies.



FEATURING THE CERAMIC-FACED SEAL AND SHORT OVERHANG IMPELLER

All Chicago C-C and F-C pumps are equipped with the most reliable mechanical seal ever built into a pump! Ceramic-faced stationary seat is highly resistant to wear. Accurately lapped surfaces and automatic adjustment for wear assures long life under strenuous service. No troublesome packing replacement and maintenance, no shaft wear commonly found with stuffing box seals.



Silence Built-In

Ball bearings close to the end of the impeller insure ample support and alignment for quiet operation always. Impeller is perfectly balanced for vibrationless, noiseless rotation.

CHICAGO PUMP COMPANY

Subsidiary of Food Machinery and Chemical Corporation

BUILDING PUMP DIVISION

[illegible] INTERNATIONAL EXPRESSWAY • CHICAGO 14, ILLINOIS

Cyclo-Vac ®, Sure Return ®, AVC, LVC, Fire, House & Circulator Pumps, Pneumatic & Tankless Water Systems, Flush Kleen ®, Sewage Ejectors, Little Giant ® & Non-Clog Sump Pumps. Pumps for every industrial use.

Random Thoughts from a Filter Engineer

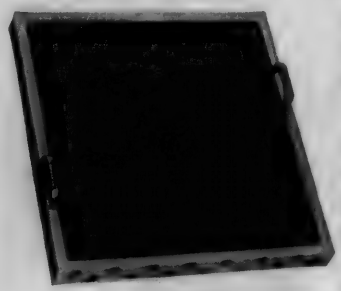
by J. P. Van Sweringen

- **SHOULD GREASE FILTERS OPERATE AT HIGH OR LOW VELOCITY?**
- **WHERE VENTILATING FILTERS SHOULD NOT BE USED**
- **THAT SOMETHING INVISIBLE THAT COMES WITH EVERY FILTER**

SHOULD GREASE FILTERS OPERATE AT HIGH OR LOW VELOCITY?

When it comes to planning a grease filter installation, you have two types of filters to choose from: the high-velocity and the low-velocity filter. Because you need fewer high-velocity filters for a given installation, some contractors and engineers feel that the saving in initial filter cost makes them the best bet. On the other hand, because high-velocity panels filter more air per filter, they fill up with grease faster. Naturally, they require servicing at more frequent intervals. As a result, many contractors and engineers feel that the low-velocity filter offers greater savings in the long run.

At Air-Maze, we make both types so we have no particular axe to grind. However, it's our honest opinion that the long-term maintenance savings from low-velocity filters more than make up for the higher initial cost of more filters per installation. Our low-velocity filter is the Greastop and we feel it has extra features that make it the finest of its kind. For instance, the fine mesh screen in the Greastop is especially protected against corrosion from the fatty acids in grease. And the progressive density of the media permits the collection of lots of lint and bulky material without unduly reducing the air flow. It's another Air-Maze extra value.



Greastop® filter.

WHERE VENTILATING FILTERS SHOULD NOT BE USED

With all the types of ventilating filters available on the market, it's easy to see how a person might believe that a ventilating filter—*some* ventilating filter—will solve almost any air filtering problem. This is not true. There are many jobs ventilating filters just can't do well. For instance, a ventilating filter falls down where dust concentration is very high, as in the case of filtering exhaust air in certain manufacturing processes.

A viscous impingement filter is unsatisfactory because the adhesive doesn't have time to "wet" the dirt particles enough so that they'll be properly filtered. And a dry or strainer type filter won't do the job either. It will stop the dust well enough but filter resistance rises too rapidly for it to be practical.

Usually, ventilating filters are not indicated when there's a dirt concentration of more than 6 grains per thousand cubic feet. And much less than this is desirable. To give you an idea of how quickly the dirt-holding capacity of a filter can be reached; at a concentration of 6 grains per thousand cubic feet, a 20 x 20 panel may be subjected to almost a pound and a half of dirt per day!

THAT SOMETHING INVISIBLE THAT COMES WITH EVERY FILTER

When you buy a product—be it a small filter or a large generator—you usually take for granted the service that comes along with it. Product features often obscure service to the extent that it isn't even mentioned before the sale is made. Yet service is the great unseen part of a product . . . the part that guarantees that the product performs at its best.

Map shows 83 Air-Maze representatives.

When you buy filters from Air-Maze, quick service is as near as your phone. Our trained representatives are located in 83 cities across the nation. They stand ready with friendly, competent help, whenever you need it. The Air-Maze Corp., 25000 Miles Rd., Cleveland 28, Ohio.

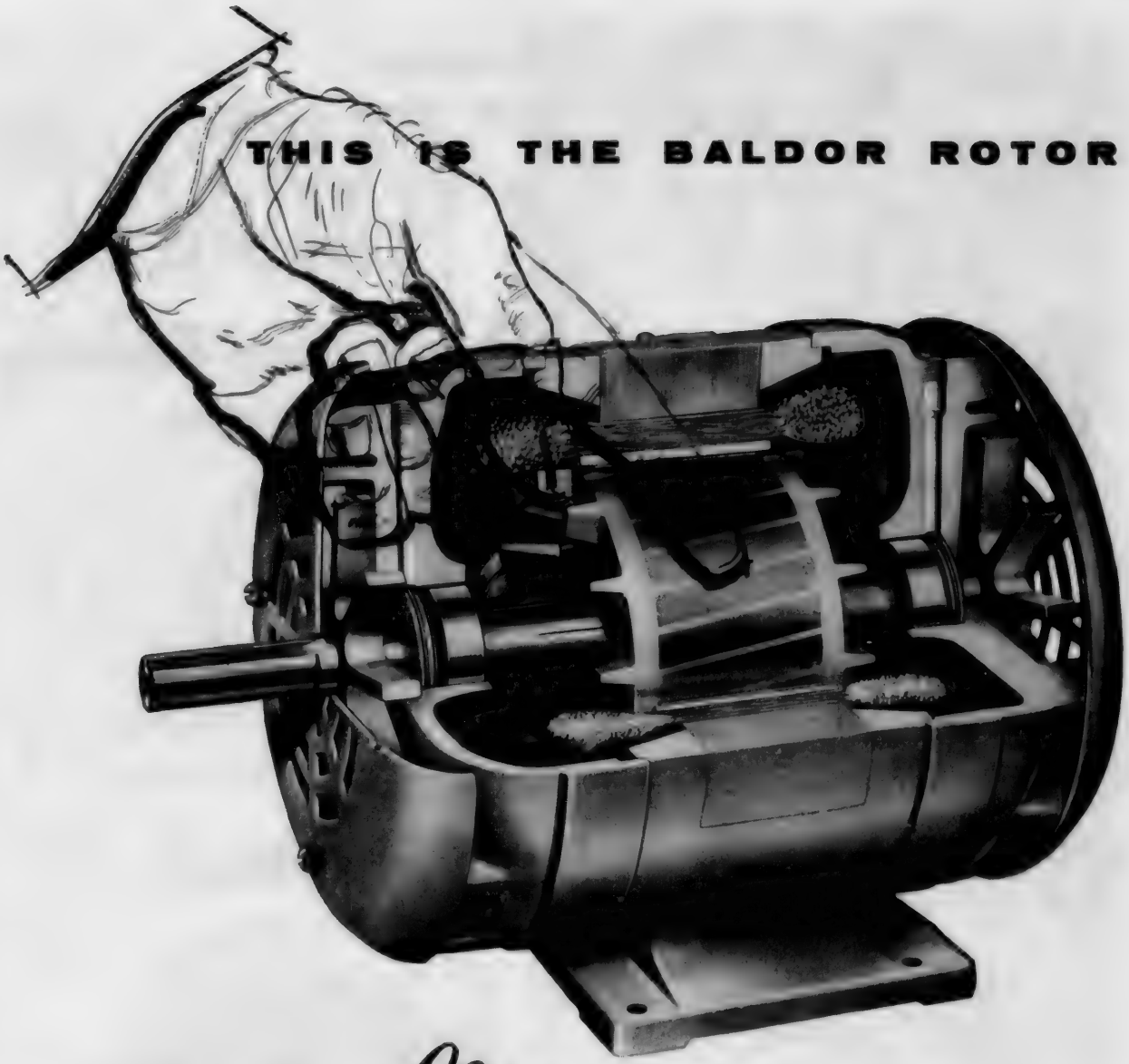
AFI MEMBER AIR FILTER INSTITUTE

AIR-MAZE

The Filter Engineers

AIR FILTERS • SILENCERS • SPARK ARRESTERS
LIQUID FILTERS • OIL SEPARATORS • GREASE FILTERS

THIS IS THE BALDOR ROTOR



CONTAINED IN THE *New* BALTRIC LINE

The rotor is the very heart of any electric motor, and the Baltric Motor contains the heart of a champion. Advanced engineering and improved techniques mark the entire Baltric line of completely enclosed motors which have achieved a rotor with less noise . . . better balance.

The new Baltric Motor is designed and built to attain the utmost in stamina and performance with less bulk and less weight. Baltric Motors can be engineered to meet your special mechanical and electrical requirements. Remember . . . they are totally enclosed, *Streamcooled* . . . your Best Buy is Baltric!

8555-B

Original *Streamcooled* Baldor Motors Available — Built to Former NEMA Standards

BALDOR ELECTRIC COMPANY

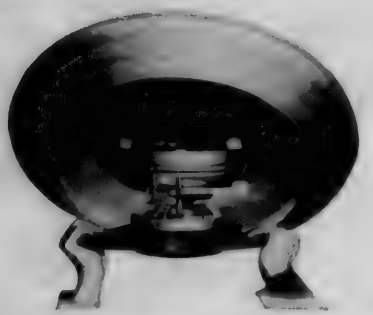
Baltric Motors Are Available in Polyphase • Squirrel Cage • Induction and Single Phase • Capacitor Start • Induction Run Types

4353 DUNCAN AVENUE • ST. LOUIS 10, MISSOURI

ONLY CARNES DIFFUSERS GIVE YOU THESE

OUTSTANDING FEATURES!

1 Easy Installation

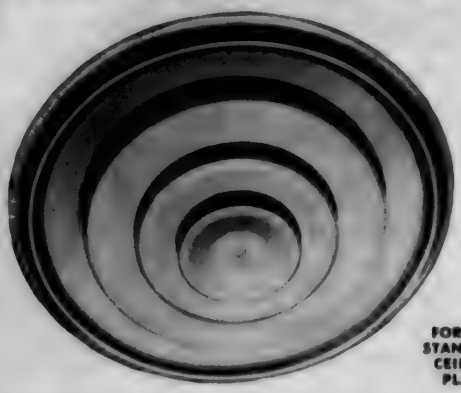


Just 3 simple steps to install Carnes diffusers: (1) Remove center cone and adapter assembly (no tools needed); (2) Fasten ceiling plate to duct work with sheet metal screws; (3) Replace center cone and damper assembly.

2 Fast, Easy Balancing and Adjusting

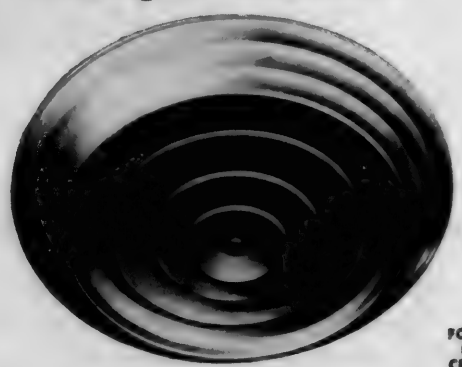
Both pattern and volume is easily accomplished from the face of the diffuser—without tools. Any pattern from horizontal to vertical is simply obtained.

3 And Lower Prices for Today's Finest!



FORM 1 STANDARD CEILING PLATE

Beautifully styled Model E (fixed cone) and Model EJ (fully adjustable) with standard ceiling plate. Can be mounted on duct work or flush to ceiling. A full range of sizes is available.



FORM 2 DEEP CEILING PLATE

Models E and EJ with deep ceiling plate that prevents ceiling aging and eliminates anti-smudge rings. A complete range of sizes available . . . all fully adjustable for air pattern.

Carnes diffusers appeal to architects for their modern, streamlined appearance; to engineers for their performance and simple balancing; to contractors for their easy installation and low price. You'll be ahead all ways . . . with Carnes!

CARNES CORP.
VERONA, WISCONSIN

PROMPT DELIVERY

Warehouses in all parts of the country assure prompt, out-of-stock shipment of all Carnes products.

This YOLOY pipe has lasted 6 times longer

The pipe shown in the photograph of this large boiler carries steam for the "soot" and "fly ash" blower system in an Ohio electric plant. The service is so severe that regular carbon steel pipe had to be replaced as often as 60 days.

A solution for this corrosion problem was obtained by installing Yoloy pipe. Now, twelve months later, the Yoloy pipe is still in service—hasn't developed a single leak. It has lasted six times longer, and looks good for many months more.

Yoloy Continuous Weld Pipe is made from the same nickel-copper steel composition that has proved so successful in the oil, mining, railroad, chemical, trucking and other industries where resistance to corrosion and abrasion is of prime importance. It is now available in pipe sizes, from ½" to 4".

Get our booklet "The ABC of Yoloy Continuous Weld Pipe and its Corrosion Resistance". Write or phone the Youngstown District Sales Office near you.

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

61,167 gauges . . . to deliver your Crane Valves 100% quality inspected

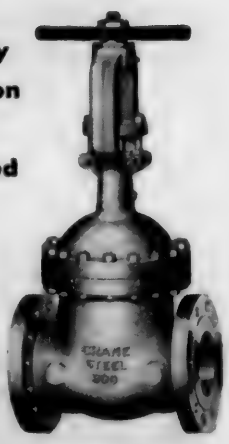
Care-how! A newly coined catch-phrase? Not at Crane! It is a rigidly-adhered-to principle of quality control—100 years old!

By way of example, the Crane technician in the photograph is checking the taper, size and guide slot alignment on gate valve discs. Every disc must correspond to the setting of the indicators—to tolerances of .001 inch plus or minus, on the taper, and .008 inch on the alignment of the slot guides. And Crane uses 61,167 gauges to insure dimensional accuracy.

Why this Care-how? To assure you of smoother, longer lasting valve operation, with lower maintenance and repair costs.

There you have the reasons why knowing and thrifty buyers prefer Crane valves . . . why industry uses more Crane valves than any other make! And the reasons why you should always buy Crane. Crane Co., General Offices, 836 S. Michigan Ave., Chicago 5, Illinois. Branches and Wholesalers serving all industrial areas.

Better Quality
Bigger Selection
In Valves
for Every Need



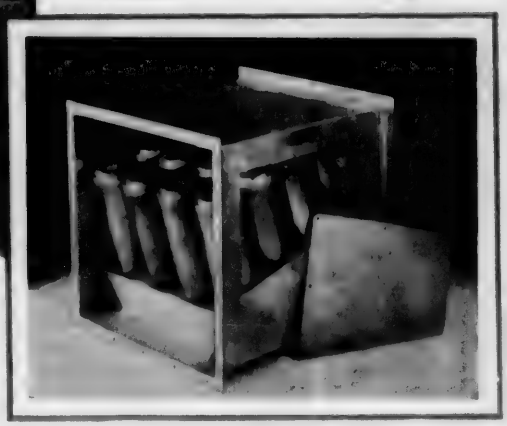
CRANE CO.

VALVES • FITTINGS • PIPE
KITCHENS • PLUMBING • HEATING

CRANE'S FIRST CENTURY...1855-1955

Traveling crane cab has to be air conditioned
Dorex Air Recovery makes it possible

DOREX installation at Carteret, New Jersey, plant of American Metal Company, Ltd., manufacturers of O.F.H.C. Brand Copper, Electrolytic Copper Powder and Atomized Metal Alloy Powders. Note, at left of crane cab, the Dorex Type H #42 Canisters. These are one of the forms in which Dorex Activated Carbon can be applied to keep air purified and dramatically reduce the amount of outside air that must be taken in.



CLOSE-UP of Dorex Activated Carbon Type H #42 Canisters. Each canister is filled with specially activated carbon granules which adsorb impurities from air passing over them. Dorex reduces by as much as two-thirds the amount of outside air that has to be taken into a system.

This overhead crane cab works in atmosphere highly contaminated by sulphur dioxide and other toxic fumes and gases, plus excessive heat. It *has* to be air conditioned. But the cab travels, and that makes it impractical to hook up an outside ventilating source for all the needed fresh air.

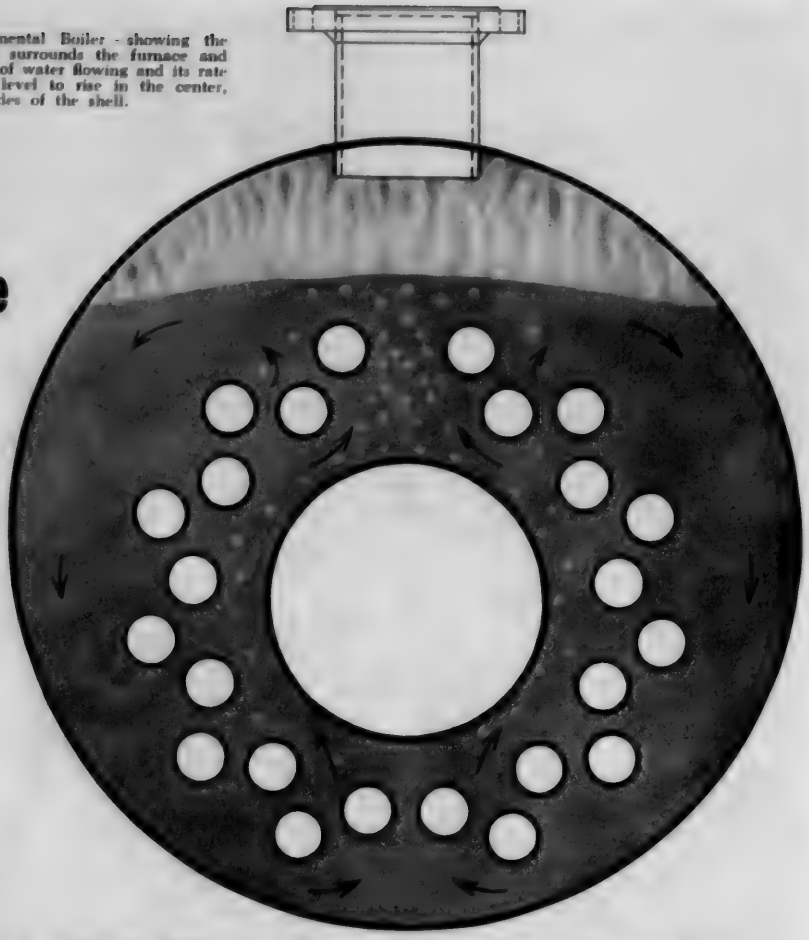
Dorex Air Recovery overcomes this difficulty. Air conditioning units inside the cab are set to use a minimum of outside air and a maximum of recirculated air—both decontaminated through Dorex Activated Carbon in combination with heavy-duty air filters.

As a result, all toxic gases are removed and temperature is maintained at a comfortable level, assuring maximum operator safety and efficiency.

CONNOR
dorex®
air recovery

If you have an air conditioning or ventilating problem, let Dorex engineers help you work out the solution. The experience of thousands of Dorex users over the past 25 years shows you'll do a better job at a lower cost. Connor Engineering Corporation, Dept. B-75, Danbury, Connecticut.

Cross-section of a Continental Boiler - showing the free flow of water which surrounds the furnace and return tubes. The volume of water flowing and its rate of flow cause the water level to rise in the center, then fall away to both sides of the shell.



What makes the Continental Boiler last longer... makes steam cost less

If you were to design a packaged boiler, water circulation would be a basic consideration because . . .

. . . poor circulation can cause overheating . . . can cause unequal stress in metal heating surfaces . . . can promote pitting and scaling on metal surfaces exposed to water . . . and can result in higher stack temperatures, decreased boiler efficiency.

But the many owners of Continental Boilers have had none of these troubles. Here are two special reasons why:

1. **Two-pass design provides even flow of combustion gases to all heating surfaces.**

Heat is thus distributed evenly to the rear tube-sheet and to all of the return tubes. Water is heated uniformly, and natural, balanced circulation results.

If high temperature combustion gases were to enter only one section of the return tube bank, the tubes in that section would be at a higher temperature, would be doing more work than the balance of the tube-sheet and return tubes. The result: water surrounding those cooler heating surfaces would have sluggish circulation.

2. **Heating surfaces in the Continental Boiler are arranged so that there is a centrally located furnace and equal spacing of return tubes.**

Of the total heat transferred to the water within a Continental Boiler, about 60% is transferred by the furnace. Thus it is essential that flow of water around the furnace be unrestricted. Note the area around and above the furnace and the open channel along both sides of the boiler shell. This design assures unrestricted flow of water around the furnace . . . facilitates rapid flow of water to the bottom of the boiler for reheating.

Uniform . . . free . . . rapid water circulation is an important reason why a Continental Boiler costs little to keep, has long service life, and makes steam cost less. For detailed information write for Bulletins BE-3, BE-4.

BOILER ENGINEERING & SUPPLY COMPANY, INC.

Phoenixville, Pa.

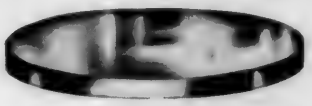
CONTINENTAL . . .
the boiler with the spinning gas technique

SARCO
Thermodynamic
STEAM TRAP

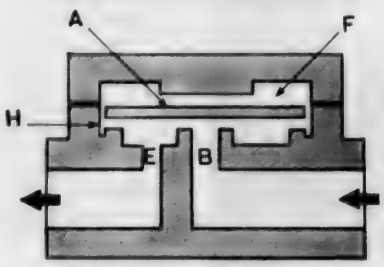
ACTUAL SIZE

this new trap virtually eliminates maintenance

SOLID STAINLESS STEEL DISC ACTS AS VALVE HEAD



HERE'S HOW IT WORKS!



Air and/or condensate raise valve seat disc A, discharge thru E. When steam follows, greater velocity causes it to strike body at H thus building up pressure in chamber F. This causes disc to seat, closing tube B. As pressure in F decreases by condensation, pressure in tube B raises disc and cycle is repeated.

The Sarco Thermodynamic Trap has proved successful on steam mains and separators; headers and soot blower pipes; engine and turbine stop valves, separators and casing drains; alternate heating and cooling applications.

2098-B

A solid stainless steel disc—practically indestructible—is the only moving part!

MOST striking feature of the Sarco *Thermodynamic* Trap is its simple maintenance-free design. There's only one moving part—a solid stainless steel disc that practically lasts forever. There are no other moving parts to wear out or cause trouble.

Condensate, air and steam act directly on the disc valve which opens to discharge condensate and air—snaps shut to contain steam. There are no mechanical devices required to operate valve (see diagram at left). That means practically endless trouble-free operation.

Other advantages: small size, easy installation, not affected by shock or vibration, immunity to corrosive elements with all wearing parts stainless steel, same valve head and seat for all pressures to 600 psi and temperatures to 950° F.

Check these advantages to your own satisfaction at absolutely no cost. We'll send you a trap for trial. All you do is fill out the coupon and mail it in.

SARCO COMPANY, Inc.
Empire State Building, New York 1, N.Y.

MAIL COUPON TODAY FOR TRIAL

Sarco Company, Inc., Empire State Bldg., New York 1, N.Y.
Gentlemen: Please send me a Sarco Thermodynamic Trap for a 60-day trial, requirements as checked.
Size: ½"... ¾"... 1"... Operating Pressure:.....psi

For installation on.....

NAME_____

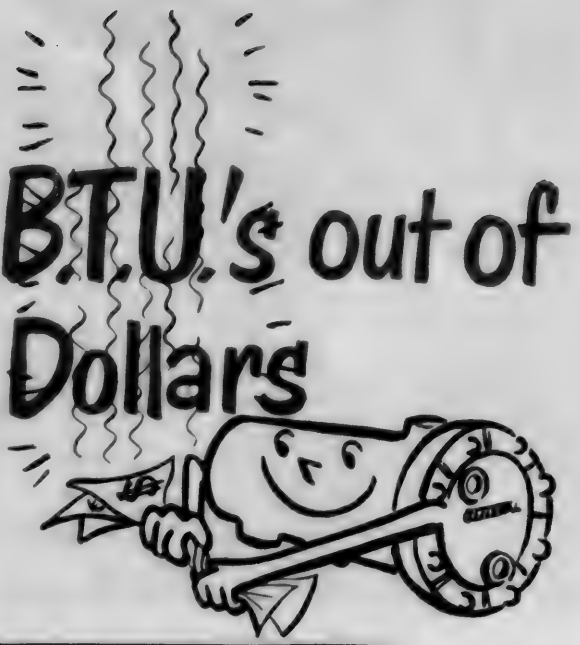
FIRM_____

ADDRESS_____

CITY_____ STATE_____

This specialized line

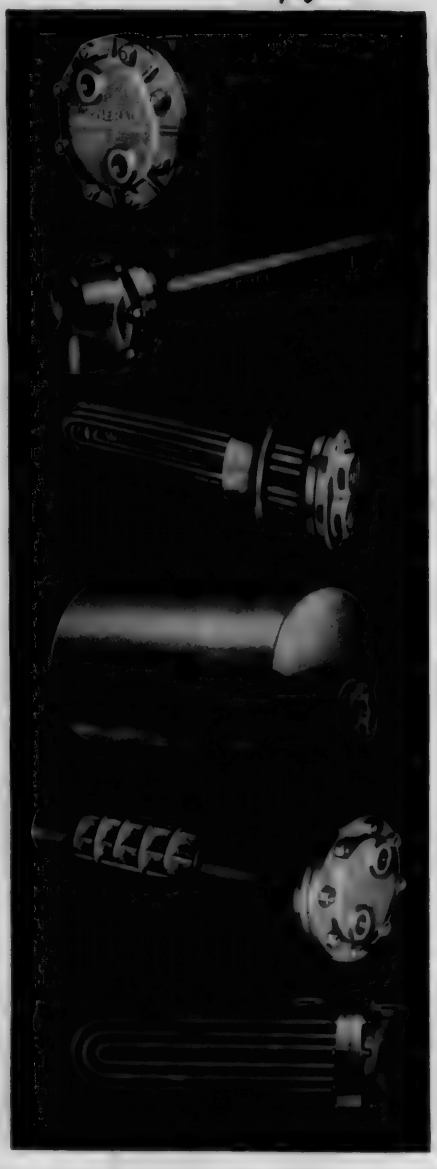
Squeezes more B.T.U.'s out of Fluid-heating Dollars



Whether the heat source for your next installation is hot water, exhaust steam, or live steam, you'll find a GENERAL Industrial Fluid Heater specifically designed to get the most heat out of it.

Every GENERAL heater is backed by 25 years experience in the manufacture of industrial fluid-heating equipment. It's the end-product of constant modification and improvement . . . "tops" for its particular application.

No matter what job you're planning — new construction, expansion, modernization — this up-to-date line is your best bet . . . for better performance, longer service, lower cost. Write for Catalog 60. General Fittings Company, Box 151F, East Greenwich, Rhode Island.



INSTANTANEOUS WATER HEATERS No tank required. 23 sizes; capacities to 300 g.p.m.; uses live or exhaust steam.

CONVERTERS 74 sizes for economical heat transfer. Flow capacities up to 900 g.p.m.

TANK HEATING UNITS 20 sizes for all requirements.

STORAGE TANKS 10 sizes; capacities to 315 gals.

FUEL OIL HEATERS 17 sizes; capacities to 375 g.p.h. at 2 lbs. pressure.

INDIRECT HEATERS 15 sizes for use with large-size storage tanks.

GF **GENERAL FITTINGS COMPANY**

TANKLESS AND INDIRECT WATER HEATERS AND HEATING SPECIALTIES

Hotel Fontainebleau — vacation landmark of Miami Beach, Florida. Griffen Industries, Inc., ventilation contractor; Taylor Construction Co., general contractors; Morris Lapidus, architect; and John K. Sasnett, mechanical engineer.

"BUFFALO" FANS contribute to the comfort of the *fabulous* FONTAINEBLEAU

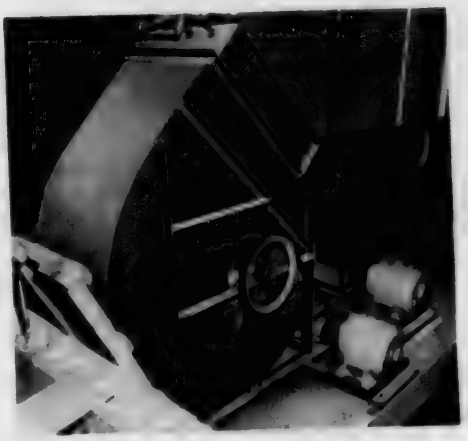
For the discriminating sun-and-fun seeker, the strikingly beautiful and luxurious new Hotel Fontainebleau on Miami Beach is the last word in elegance.

No comfort or health facility was overlooked in planning this fine hotel. The large, modern kitchens, for example, enjoy fresh, cooling air at all times, thanks to the "Buffalo" Type BL Limit-Load Ventilating Fans shown at right.

Says Charles P. Little, Chief Engineer of the Fontainebleau: "It's a real satisfaction to have such dependable equipment as these 'Buffalo' Fans. They have lived up to every performance specification. They're doing a big air moving job, keeping their zones thoroughly ventilated at all times, and doing it with so little noise and attention, you almost forget they're there."

For air results like this, specify "Buffalo", the "Q" Factor* Fans with a 78 year history of top performance.

** The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*



These two "Buffalo" Type BL Ventilating Fans keep the air of the Fontainebleau kitchens fresh and cool.

"Buffalo"

BUFFALO FORGE COMPANY

480 BROADWAY BUFFALO, NEW YORK

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Sales Representatives in all Principal Cities

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING

Series G Thermostatic Trap

Standard Pressure Range 15 pounds to 25 inches vacuum

Series 45 Steam Trap

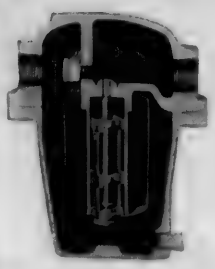
For pressures between 400 and 600 lbs. Body and Cover of special steel

from 25" vacuum to 600 lb. pressure

ILLINOIS STEAM TRAPS

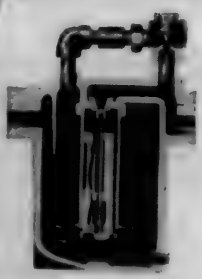
Series G Float and Thermostatic Trap

Standard Pressure Range 15 pounds to 25 inches vacuum



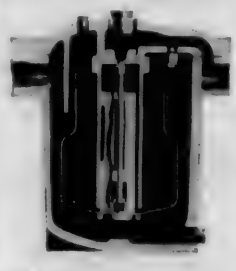
Number 30 Steam Trap

For Pressures up to 150 pounds



Series 36 Steam Trap

For pressures up to 30 pounds



Series 35 Steam Trap

For pressures up to 250 pounds

Prevent Steam Waste—Save Fuel

No matter what your condensate drainage problem may be—for low, medium or high pressure steam or compressed air service—there is an Illinois Trap exactly suited to do the job efficiently, economically. You have a wide variety of types and sizes from which to choose. Before your next trap purchase investigate Illinois with its outstanding record for preventing steam waste and saving fuel. The Illinois representative nearest you will furnish facts and figures—or write for bulletins.

1880 55 1955 YEARS Illinois

illinois ENGINEERING

ILLINOIS ENGINEERING COMPANY
DIVISION OF AMERICAN AIR FILTER COMPANY, INC.
2035 SOUTH RACINE AVENUE • CHICAGO 8, ILLINOIS

BARBER COLMAN

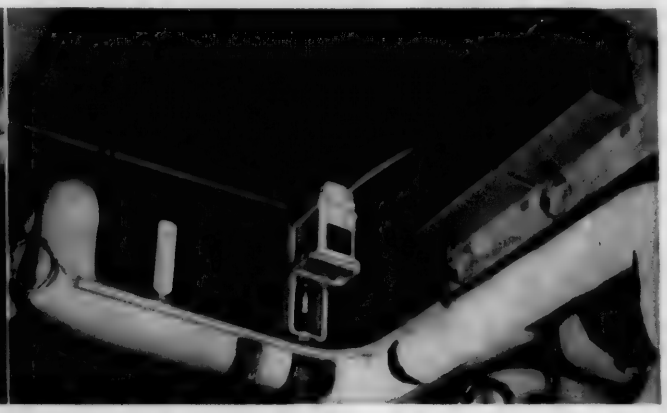
ELECTRIC Automatic Controls

at Wisconsin Bell, it's "better control . . . electrically"

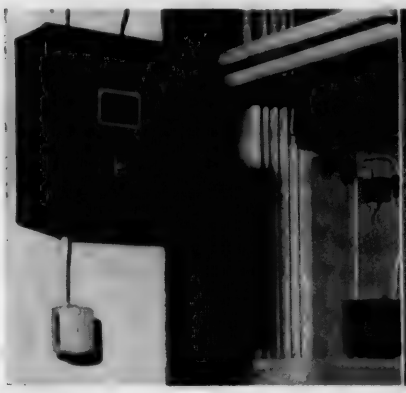
Telephone engineers, keenly aware of speed, accuracy, and dependability of electrical equipment, are using electric-electronic controls for heating, ventilating, cooling, and humidifying their buildings. New structures, additions, and modernized exchanges are getting *"better* control . . . electrically" as the telephone industry's huge expansion program moves ahead. Here, in Beloit, Wisconsin, is a typical all-electric installation, utilizing the very latest in control developments to guard sensitive telephone equipment from moisture damage, plus providing indoor comfort for employees and visitors. Similar systems are being installed in exchanges throughout the nation.

Architects: GRASSOLD-JOHNSON & ASSOCIATES. *Consulting Engineer:* JOSEPH H. VOLK (deceased). *Heating & Ventilating Contractor:* THOS. E. HOYE HEATING CO. *Sheet Metal Contractor:* LOUIS HOFFMAN CO., INC.— all from Milwaukee, Wisconsin.

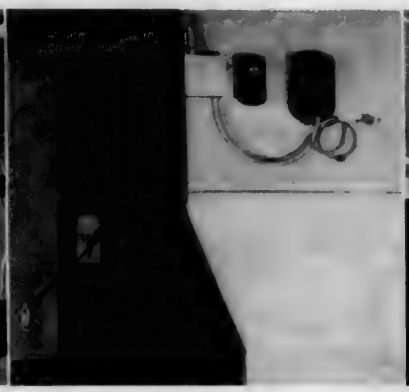
Attractive, modern offices — electric controls provide comfortable atmospheric conditions which encourage continuing employment, clerical accuracy. Desired temperature and humidity are maintained "on the nose."



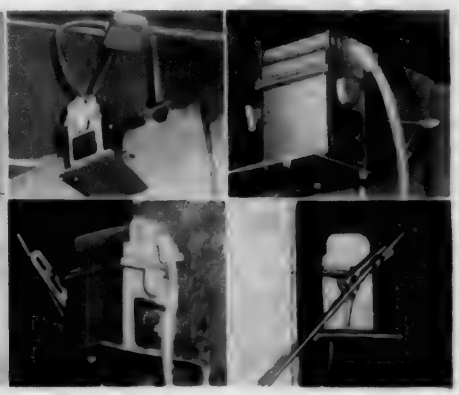
Adjustable ratio outdoor reset controls in cabinets actuate two 3-way valves. One valve controls water temperature for ceiling panel heating system. Other valve controls temperature for hot water radiation system.



Control Center cabinet serves as central junction box, houses prewired accessories, numbered terminal strips. Humidity control panel at right.



Remote bulb Microtherm on return air duct, operates proportioning valve on coil. Damper motor (left) positions return air damper.



Dependable, powerful, electrically operated Control Motors provide positive positioning of dampers in supply and return air ducts.

Flexibility and economy of electric-electronic control systems are well illustrated in this application. Two outdoor reset control systems assure maintenance of even, comfortable temperatures inside, with minimum waste of heat. One system controls ceiling panel heating, the other, hot water radiation. A small overhead heating unit in the basement has its own set of controls. Ventilating equipment and humidifiers are likewise equipped with individual control systems. Availability of power lines throughout the building simplified installation, decreased costs.

Every building, large or small, can be provided with similar flexibility and reliability at costs often lower than anticipated.

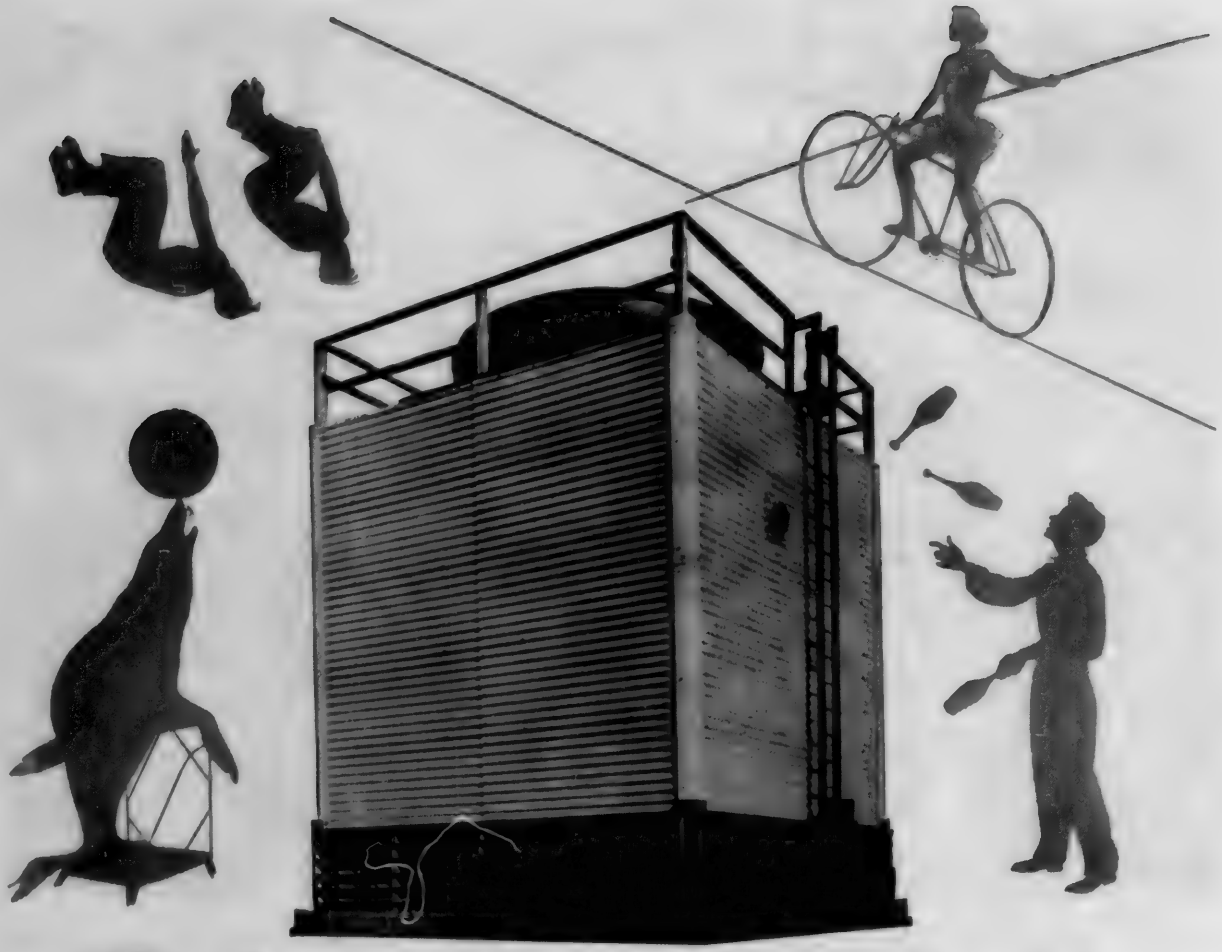
Check with your nearby Barber-Colman Field Office (consult phone directory) for expert engineering counsel, latest literature, and prices. Join the modern trend to *"better* control . . . electrically!"

Barber-Colman Company

Dept. S, 1302 Rock Street, ROCKFORD, ILLINOIS, U. S. A.

Field Offices in principal cities

Automatic Controls • Air Distribution Products • Industrial Instruments
Aircraft Controls • Small Motors • Overdoors and Operators • Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery



Balance, too, is important in

COOLING TOWERS

In the new CW SERIES COOLING TOWERS Marley engineers have achieved a high performance level that takes these counter-flow towers out of the "conventional" class. A carefully balanced expansion of major design elements results in more cooling ability for every frame size. These asbestos cement board cased redwood towers have:

GREATER FILL VOLUME – with more wetted surface in each cubic foot.

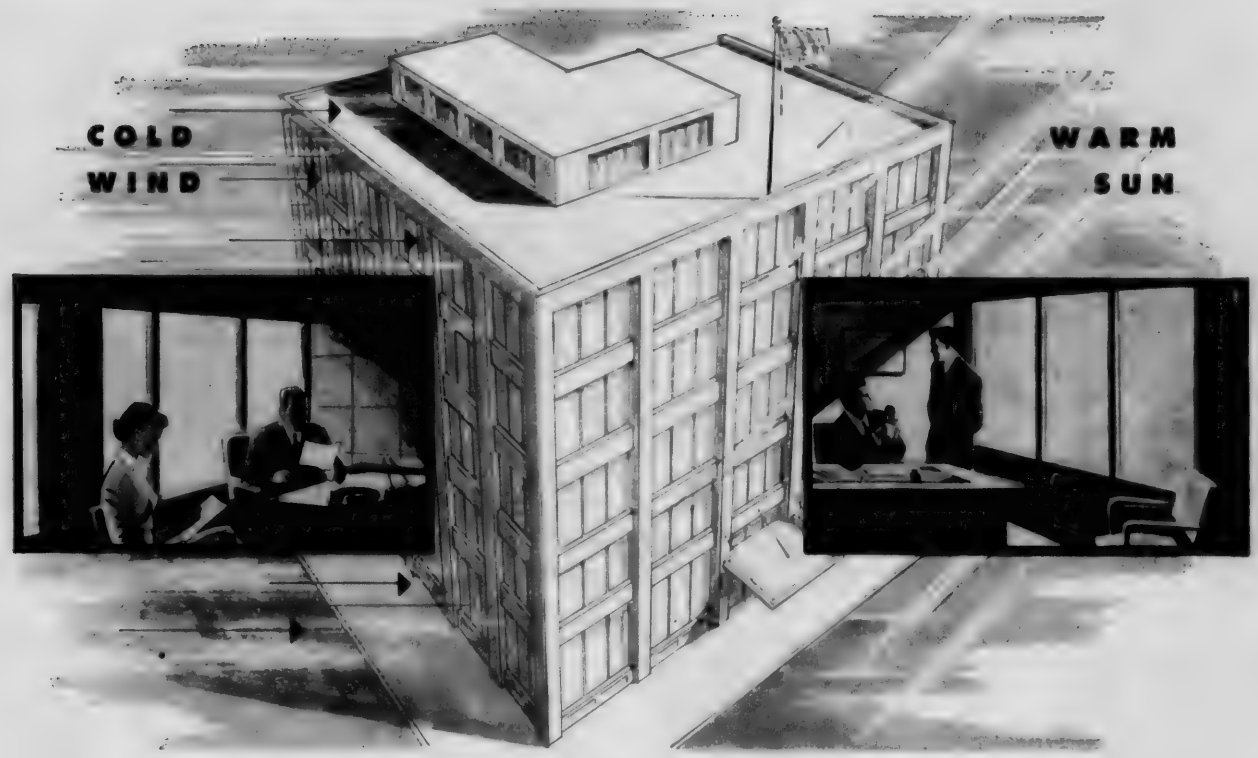
GREATER SPRAY BREAK-UP – high pressure down spray on closer centers.

Tradition has been discarded in the design of CW towers. The new closely packed filling affords an area of wetted surface that is new in concept, yet is positioned for minimum pressure drop. The increased surface cooling permits high pressure, close-center spray distribution for best primary break-up and cooling. Of course, these increases require more air and it's provided by more generous louvered openings, by high fan efficiency. There is no "too much" or "too little" in the CW design; balance is the keynote—balance that means more cold water . . . at record low cost. Steel cased and all-steel models are available.

MARLEY

The Marley Company

Kansas City, Missouri



No Heating Problem

Iron Fireman SelecTemp Heating adjusts automatically to heat loss or gain in *each individual room or office*

A thermostat in every room
When every room is a separate heating zone, a lot of problems that a conventional system can't touch are solved automatically.

Each room takes care of its own heat loss or gain, no matter how much conditions may vary in different parts of a building.

Occupants may have any temperature they choose simply by setting the thermostat in their own room or office. They use only the amount of heat they need. No space is overheated. Nor is there any wasteful heating of unoccupied space. Temperature can be reduced in any unused room, and restored to comfort level within a few minutes when needed.

Ideal for motels, hotels, apartment houses and hospitals. Every guest and tenant has his own idea of heating comfort, and is usually vocal about it. SelecTemp heating has eliminated a lot of headaches for building managers, besides making tenants happy.

Iron Fireman SelecTemp heating is especially valuable for hospitals, where it is often desirable to control room temperatures according to individual needs of patients.

Send for descriptive booklet
Iron Fireman SelecTemp heating is fully described in a booklet specially prepared for architects and builders, containing all necessary specifications. Use coupon below.

SELECTEMP HIGHLIGHTS

THERMOSTAT IN EVERY ROOM. Temperatures can be varied in every room to fit the "activity plan" and personal preference of the occupants.

MODULATED HEAT. Air circulation is continuous. Both temperature and volume of air are automatically modulated, as required to offset heat loss from room.

FILTERED, CIRCULATED AIR. Individual room air circulation prevents transmission of odors or bacteria from other rooms. Air is cleaned by a spun glass filter in each room unit. Filtered outside air can be introduced if desired.

BOILER LOCATION. Boiler can be placed in any desired location, with proper distribution of heat to every room. Year-around domestic hot water coils available. Fuels: Gas, oil or coal.

LOW POWER COST. No electricity required to operate circulating fans. Nonelectric thermostats.

LOW INITIAL COST. Easily installed in either new or old construction. Small soft copper tubing (¾ inch I.D.) carries steam to individual room heater units. Return lines are ½ inch. Substantial savings in installation costs.

LOW FUEL COST. Temperature easily reduced in unused rooms. Overheating is eliminated.

AUTOMATICALLY BALANCED. No special adjustments of dampers, valves or orifices required to balance heating system. Each unit continuously regulates heat needed for each room. Automatically compensates for external heat sources such as fireplace or solar heat, without affecting temperatures of other rooms.

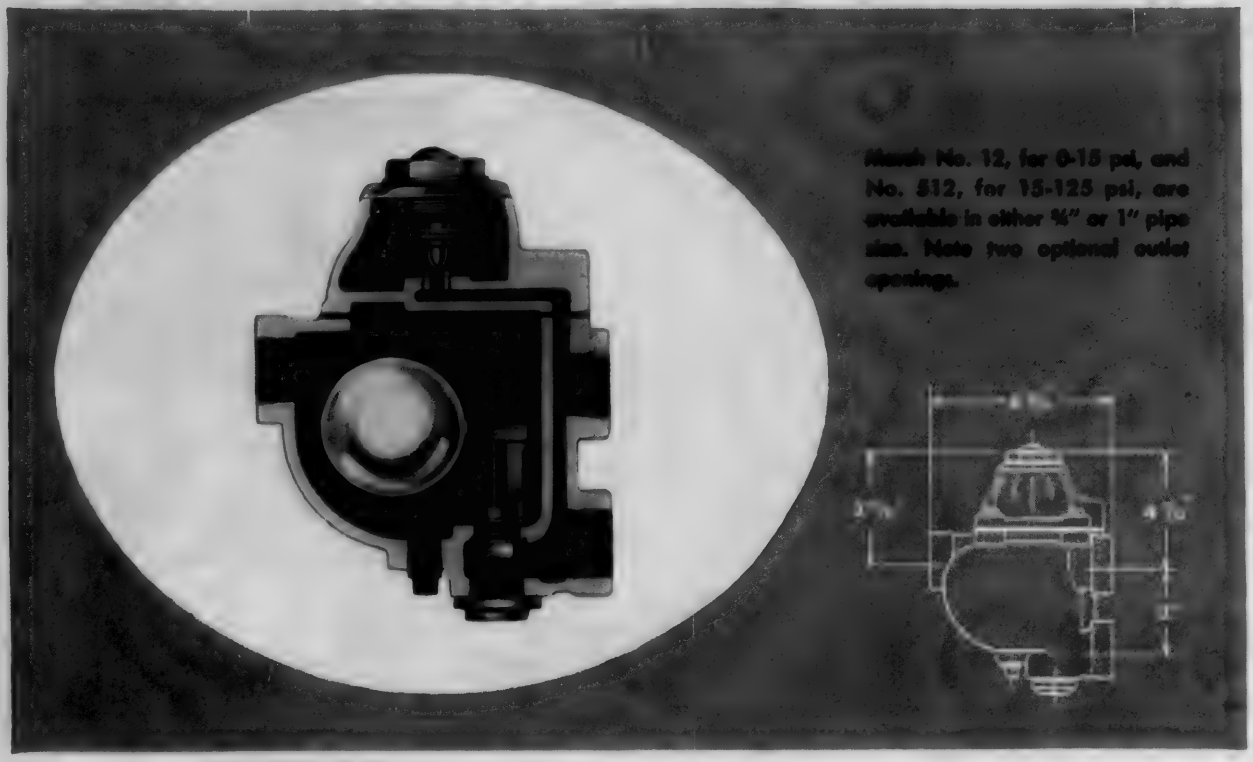
Iron Fireman®
SelecTemp®
MODULATING ZONE HEATING

Send for free booklet . . .
IRON FIREMAN MANUFACTURING CO.
3067 West 106th Street, Cleveland 11, Ohio.
In Canada, write to 80 Ward Street, Toronto, Ontario.
Please send literature on Iron Fireman SelecTemp heating.

Name _____
Address _____
City _____ State _____

MARSH No. 12

Float and Thermostatic Trap



. . . The most dependable trap you can use

There are many jobs that only a float *and* thermostatic trap can handle properly . . . and in the Marsh No. 12 you have the most respected F & T trap ever developed.

Here is a trap that counts its users in thousands. Repeat orders are the rule because men who know have discovered that no other trap can quite duplicate its absolutely dependable, trouble-free performance in removing all air and condensate from steam mains, branches, risers, unit heaters, coils, and similar applications.

Two precision-built assemblies accomplish this. All condensation is discharged by the float-operated valve located at the low point in the trap body. All air is vented through the by-pass by the action of the thermostatic diaphragm, but this is one of those Marsh diaphragms that closes the valve immediately in the presence of steam. In fact the accuracy of response is the attribute that distinguishes the Marsh thermostatic element. It gets the air out and keeps the steam *in!* Another big feature is the straight through design which eliminates troublesome excess piping.

No. 12 is your F & T trap for those low pressure applications — up to 15 psi W.S.P. but its identical-in-operation companion, No. 512, covers the working pressure range of 15 to 125 psi. There is a Marsh trap for every low or medium pressure application.

Write for catalog 76-H covering Marsh heating specialties

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Entrance to General Offices, Brown Shoe Company, St. Louis, Mo.; Architect: Russell, Mullgardt & Schwarz, Van Hoefen; Engineer: Ferris & Hamig; Contractor: Kremer-Hicks.

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Rear view of typical Electro-PL installation serving each of building's six air conditioning systems.

AAF Electro-PL Electronic Filters Assure Clean Air For New General Office Building

CLEAN AIR is never an afterthought in the planning of modern, highly functional offices. In the case of Brown Shoe Company, dust and dirt are barred forever from their attractive, new St. Louis offices. Each of the building's six air conditioning systems, totaling 192,000 cfm, is equipped with Electro-PL Electronic Filters.

The Electro-PL is an AAF "exclusive"— a dry-type electronic unit offering twice the efficiency of ordinary dry filters—at low initial cost. Employing electronically charged Airmat media, Electro-PL's simplified maintenance requires no water or sewer connections—needs no oil to retain precipitated dust. Each renewal of the filtering media restores the Electro-PL to its original high efficiency. And, even in the case of power failure, this unit still maintains efficient filtration.

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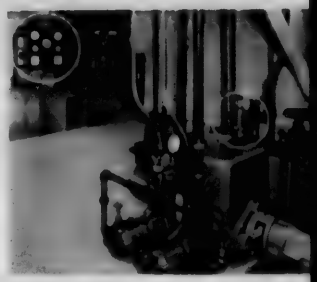

Illinois Selectotherm — an automatically controlled high vacuum steam heating system which, through single dial control, balances heat supply against heat loss to provide even, constant warmth.

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"The Sky's The Limit"

Bloomingdale's new California-styled department store, Stamford, Conn. General contractors: The Austin Co.; consulting engineer: Edward Ashley—both of New York.

Inside, American Blower equipment is quiet-operating; no distracting "machinery" noises to annoy customers.

Louis D'Orso of Richards & Jessup Co., Stamford, Conn., says: "Thanks to American Blower, we were able to meet Bloomingdale's 120-day deadline."

Air conditioning: from blueprint to Bloomingdale's in just 120 days!

American Blower helps contractor meet unusual installation deadline

Eighteen American Blower Supply and Exhaust Fans are housed in concealed, soundproof rooms; recirculate cooled (or warmed), dehumidified air—with seven air changes per hour. System also includes: 28 Venturafin Unit Heaters, Heating and Cooling Coils.

Richards & Jessup Co.—air-conditioning contractors—had a tough assignment. Starting from blueprints in March, they were to install an air-conditioning system in Bloomingdale's Stamford, Conn. department store and have equipment on the job *by July!*

"American Blower did an excellent job of furnishing equipment for Bloomingdale's air-conditioning system," reports Louis D'Orso, Richards & Jessup superintendent. "This was no ordinary job. American Blower had to tailor-make and ship the equipment—and we had to install it—all within 120 days!

"We made it all right—thanks to American Blower's exceptional service. Their representatives were in and out of here constantly, seeing to it that every piece of equipment met specifications exactly. We believe service like this, plus American Blower quality and price, are hard to beat."

If *your* plans include an air-conditioning or air-handling system, call your American Blower or Canadian Sirocco Branch Office—and talk over the benefits and economies of American Blower equipment with one of our experienced representatives.

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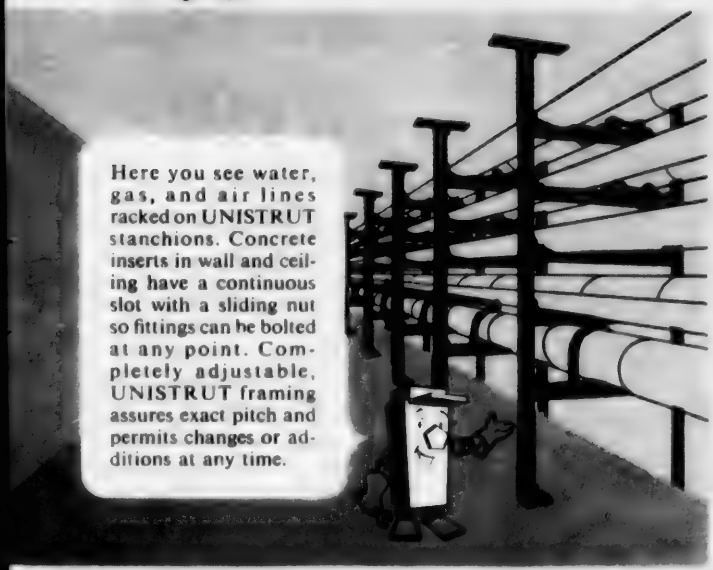
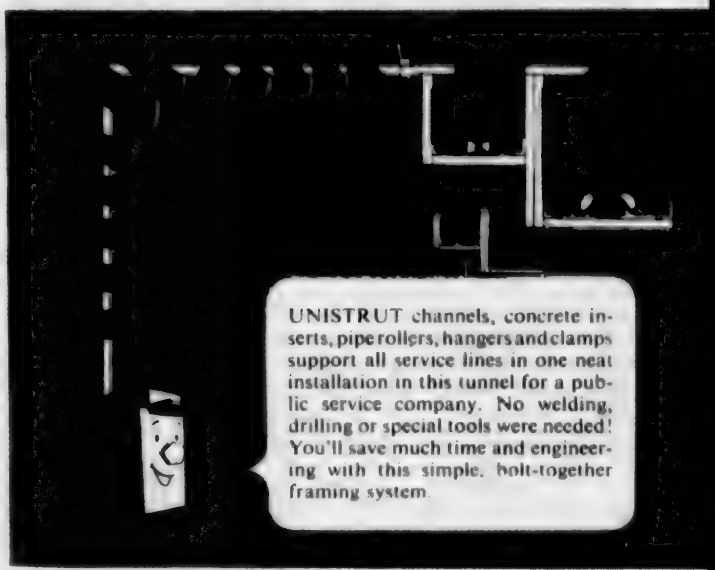
"The Sky's The Limit"

—when you build with UNISTRUT®

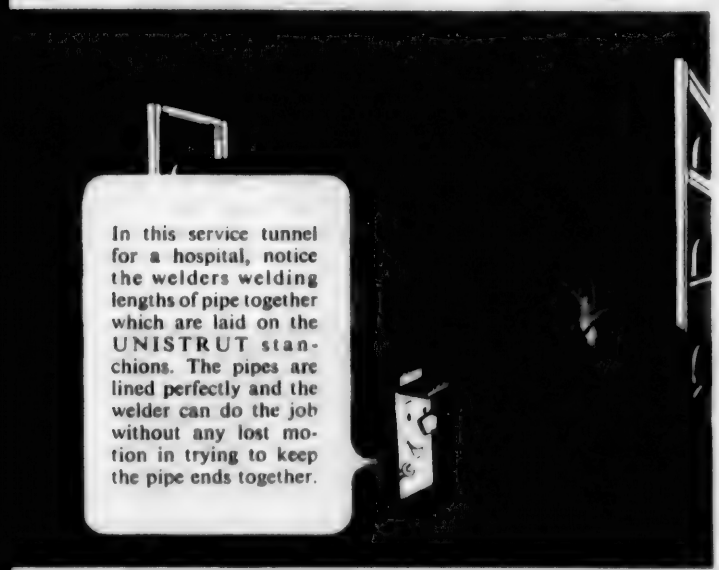
Mr. Strut cuts pipe racking costs four ways with UNISTRUT® framing



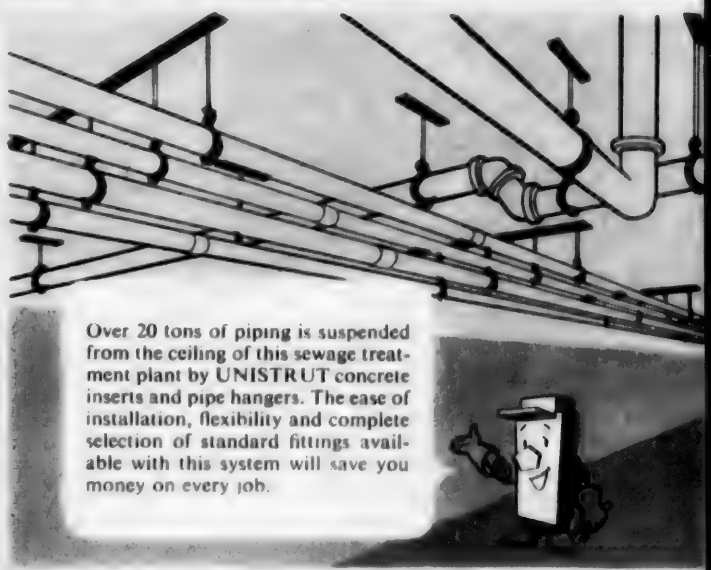
Here you see water, gas, and air lines racked on UNISTRUT stanchions. Concrete inserts in wall and ceiling have a continuous slot with a sliding nut so fittings can be bolted at any point. Completely adjustable, UNISTRUT framing assures exact pitch and permits changes or additions at any time.



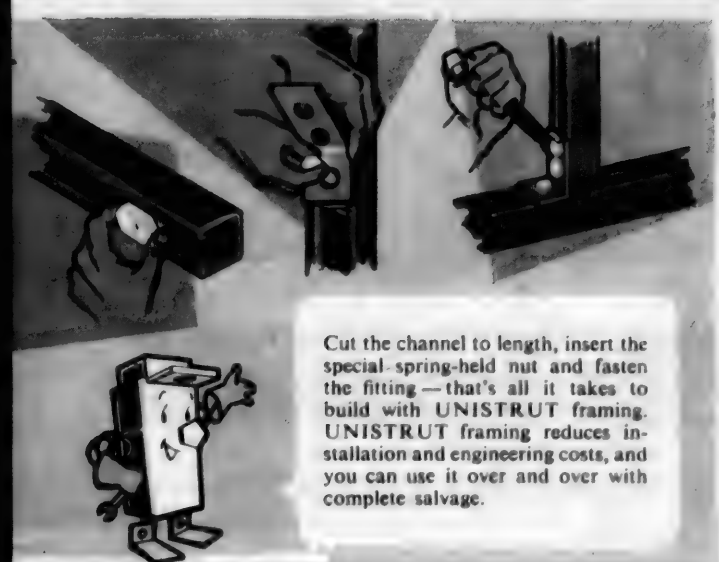
UNISTRUT channels, concrete inserts, pipe rollers, hangers and clamps support all service lines in one neat installation in this tunnel for a public service company. No welding, drilling or special tools were needed! You'll save much time and engineering with this simple, bolt-together framing system.



In this service tunnel for a hospital, notice the welders welding lengths of pipe together which are laid on the UNISTRUT stanchions. The pipes are lined perfectly and the welder can do the job without any lost motion in trying to keep the pipe ends together.



Over 20 tons of piping is suspended from the ceiling of this sewage treatment plant by UNISTRUT concrete inserts and pipe hangers. The ease of installation, flexibility and complete selection of standard fittings available with this system will save you money on every job.



Cut the channel to length, insert the special-spring-held nut and fasten the fitting—that's all it takes to build with UNISTRUT framing. UNISTRUT framing reduces installation and engineering costs, and you can use it over and over with complete salvage.

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Send today for your free copy of the 78-page catalog No. 700. Shows countless examples of how to rack, frame, suspend and support all kinds of mechanical and electrical equipment.

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2327587 2541908 2329815 2345650
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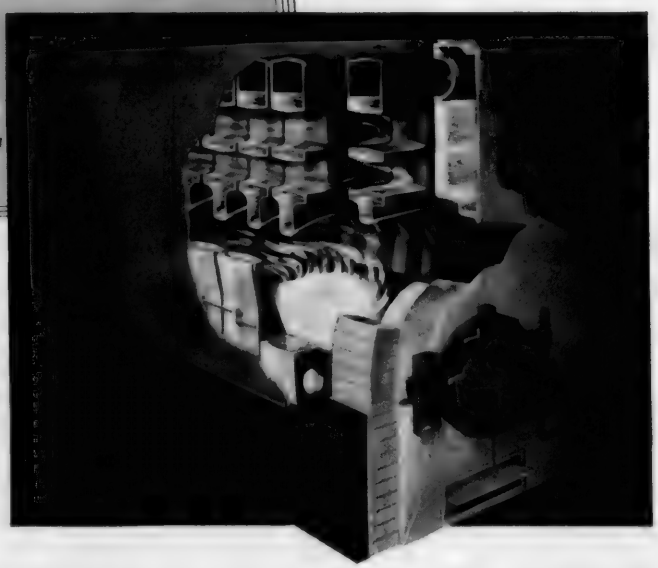

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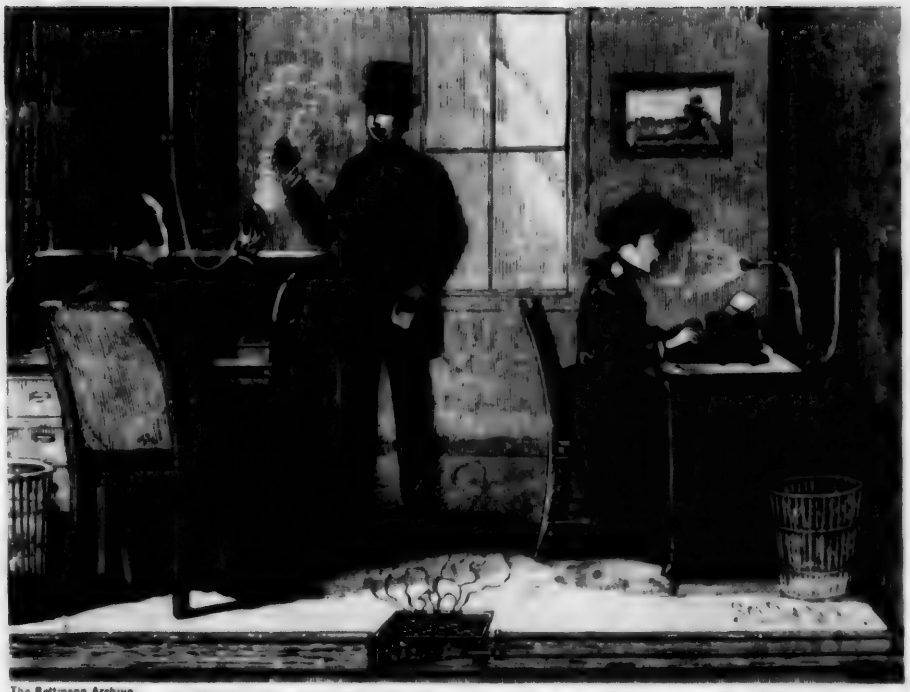

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Here's air conditioning "custom-tailored" to an 1890 business office. Today Airtemp can give you specialized assistance to solve your clients' air conditioning needs.

AIRTEMP is "on call" to serve you!

AIRTEMP SOLVES SPECIALIZED PROBLEMS

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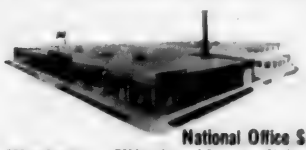
Big Bear Supermarket, Detroit, Michigan. Engineers: Jentzen-Miller Co. Air conditioned in 1953. (All 26 Big Bear Supermarkets in Detroit area are air conditioned by Chrysler Airtemp!)



National Office Supply Company, Waukegan, Illinois. Air conditioned in 1954. Contractor: Stiles Brothers, Incorporated.

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The System to Meet Your Need
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AIR CONDITIONING AND HEATING FOR HOMES, BUSINESS, INDUSTRY

THIS NEW VACUUM HEATING PUMP

HAS THE INCREASED AIR CAPACITY EFFICIENT HEATING PRACTICE DEMANDS

It's the Nash CSM

Designed and manufactured by the organization that made the Jennings Manifold Heating Pump standard of the Heating Industry, the new CSM incorporates every desirable feature architects, engineers, owners and operators have sought. Employing separate air and water pump elements, each with its own motor and each independently controlled by its own automatic switch, the capacities and arrangement may be widely varied to meet job conditions. For the first time, the engineer has the choice of realistic water and air capacities required for rapid system response without wasteful overheating.

These pumps possess many other features which permit a more efficient utilization of fuel and minimum use of electric power. Low, low returns reduce installation costs and usually eliminate putting the pump in a pit. Simplicity and efficient operation reduce supervision and maintenance costs. Information regarding this new heating pump development is available immediately upon request.

- Increased air capacity induces rapid system response without wasteful overheating.
- Separate air and water pumps individually selected to meet actual job requirements.
- Control system that operates individual pumps only when needed.
- Flexibility permitting addition of radiation without changing basic pump installation.
- Low, low, return line connection.

NASH ENGINEERING COMPANY

437 WILSON, SO. NORWALK, CONN.

Air Conditioning a Central Computer

E. C. LAMBERT

Air Conditioning Division, Westinghouse Electric Corp., Philadelphia, Pa.

JOHN C. SIMS

Eckert-Mauchly Division, Remington Rand, Inc., Philadelphia, Pa.

Fig. 1. The central computer which is the "brain" of the system.

A special air conditioning system was designed to cope with the excessive heat produced by 5400 vacuum tubes that are part of an electronically controlled computer. Four chilled water units cool the 16,000 cfm air circulated through the computer. This system has increased tube life and reduced maintenance costs.

WHEN either man or machine operates almost continuously at maximum efficiency on a difficult problem, there is almost bound to be a large expenditure of energy in the form of heat. And when you consider a device far superior to a human in its ability to add, subtract, multiply, divide, and store hundreds of thousands of digits per second, you can appreciate that the heat problem becomes enormous. This device, the Remington Rand Univac Computer, which is a product of the Eckert-Mauchly Division of Remington Rand, Inc., has 5400 vacuum tubes with a heat output around 341,000 Btu per hour.

Since the installation of an air conditioning system over a year ago, Remington engineers have found tube life has nearly doubled, maintenance and manpower hours have been considerably reduced and continuous operation of the Univac is assured with any ambient temperature.

Facts About The Computer

The central-computer, Fig. 1, is the "brain" of the system and can execute about 2,000 instructions a second. Its memory can store 12,000 digits or alphabetic characters at 1000 addressable locations. Basic rates for typical operations are:

1. Addition and subtraction	1905 per second
2. Multiplication	465 per second
3. Division	257 per second
4. Comparisions	2740 per second

Original analog and digital computers were developed for the government. The analog computer receives and analyzes information and, for example, directs a gun to follow a moving target. The digital computer, on the

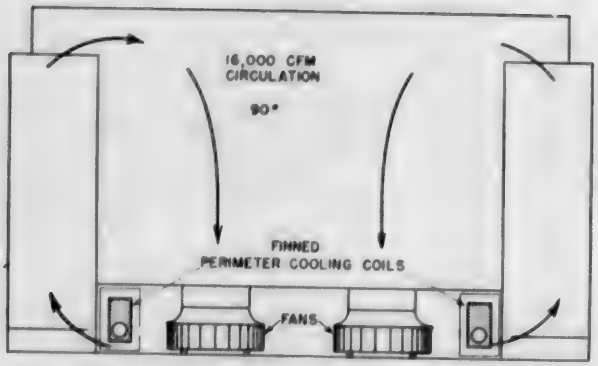


Fig. 2. Computer section showing air cooling cycle.

other hand, is an extremely high speed calculating machine of the two main types of electronic brain and is the one best adopted to industrial application. Such units are now being used on payrolls, inventory control, and production planning. There is little dobut that the computer is a vital key to the automatic factory of the future.

Early Cooling

A few of the early Univacs were cooled with 20,000 cfm outside air for the central-computer, and 7,000 cfm for the power-pack. This method proved unsatisfactory for the following reasons:

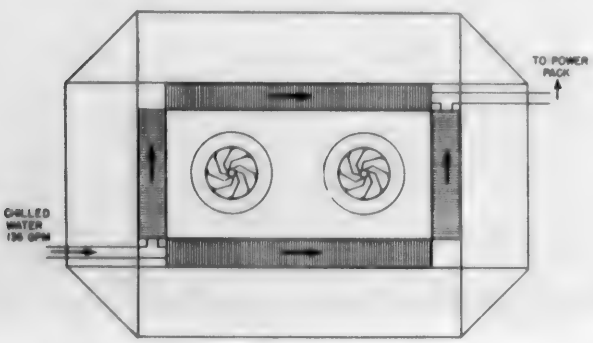


Fig. 3. Computer plan showing chilled water circuit.

1. The system was too bulky.
2. Ducts were large, requiring holes in the floor for duct connections.
3. Location of the instrument was restricted.
4. Blower motors were large.
5. Close control was impractical.
6. Temperatures were excessive.
7. Dust constituted a serious maintenance problem.

To overcome these difficulties, an air conditioning system using mechanical refrigeration was developed, and this has been in successful operation since September, 1953.

Air Conditioning System

The computer and the power-pack require approximately 70% and 30% of the air conditioning load respectively. The computer is housed in a cabinet 14 ft long, 8 ft high and 8 ft wide. Fans and cooling coils are located beneath a false bottom.

The vertically-mounted fans, driven by 3 hp motors, cool the computer by circulating approximately 16,000 cfm of air through four-row finned cooling coils. The fans draw air from the center of the cabinet, down into the false bottom, force it through the cooling coils around the perimeter, and finally up through the panels and back to the center as shown in Fig. 2. A cabinet temperature of 90 deg F is maintained with approximately 73 deg air leaving the coils. One duplicate fan, motor and similar coil-bank is used for the power-pack. Since the air cycle is closed, the dirt problem from the outside air is eliminated and filtering becomes unnecessary.

Chilled Water Flow

Each Univac is equipped with a circulating chilled water pump operated by a 3 hp motor and delivering 135 gpm. A minimum of 50 deg water is used to minimize sweating within the cabinet. This pump draws in the desired quantities of 50 deg water from the common chilled water system and return-water from the power-pack. This mix is circulated through the two-pass coil in the computer, then through the one-pass coil in the power-pack, and finally back to the pump or common chilled water system. See Fig. 3. Under full load conditions, the temperature of the water leaving the computer is approximately 55 deg, and water leaving the power-pack is approximately 57 deg.

The chilled water system to cool four computers consists of four independent, identical refrigeration cycles using Freon-12. The water cycle is paralleled. One circulating chilled water pump is operated by a 15 hp motor, and a standby is provided for emergency conditions. Each refrigeration cycle consists of a Westinghouse 40-hp reciprocating compressor, a water-chiller, and an evaporative-condenser with accessories. The condensers are located on the roof directly above the equipment room. With 135 gpm circulation and 50 deg leaving water, the capacity of each system is 40 tons with 78 deg wet bulb and 105 deg condensing temperature.

The condenser, Fig. 4, has all prime surface copper coils and hot-dipped galvanized casing. It is equipped with an 8000 cfm, 2 hp fan and a 45 gpm, ½ hp circulating water pump. The coils are ¾-inch overall diameter with 443 sq ft of surface and 19.3 sq ft of face area.

Fig. 4. Evaporative condensers located on the roof.

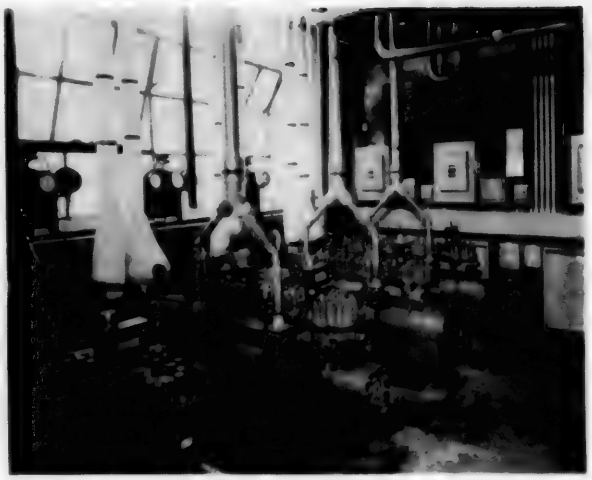


Fig. 5. Hermetically sealed compressors with 40 hp motors.

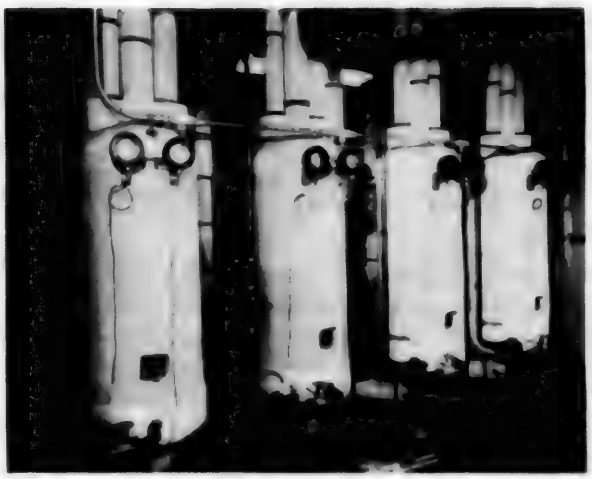


Fig. 6. Insulated semi-flooded water chillers with expansion valve feed. Water circulating pumps are in the background.

The type compressor used, Fig. 5, has eight cylinders in line, 3-inch bore by 3½ inch stroke, and operates at 1150 rpm. Capacity reduction of 50% is used. The 40 hp motor is direct connected and refrigerant cooled. The entire assembly is hermetically sealed and is accessible for field inspection and maintenance. The input, under design operating conditions, is 37.2 kw and a two-point acceleration magnetic cushion starter is used.

The water chiller, Fig. 6, is the semi-flooded type with Freon in the vertical shell and water in the concentric, helical copper tubes. Liquid refrigerant enters the bottom of the shell from the expansion valve and the suction gas goes out the top.

Since the cooling load is entirely electrical, full capacity is needed the year round. A complete electrical control system is used with all required safety controls. To prevent winter freeze-up of the condenser water, a thermostatic control will open a valve and dump the water when the water temperature reaches 35 deg. The tank is refilled when the compressor is started. This procedure has proven successful under extreme weather conditions in Philadelphia and no freeze-up occurred during operation of the system. Head pressure control is provided by cycling the condenser fan.

The demand for chilled water is practically instantaneous when the computer is placed in operation, and the reverse when it is turned off. Therefore, the controls and system are very sensitive and responsive to prevent overheating or over-cooling.

The basic control of the chilled water system is a modulating-type thermostat located in the water line leading from the chillers. This thermostat controls an eight-step controller with one minute timing. The controller regulates the operation of the compressors and capacity reduction devices. The chilled water pump is put into operation through a time clock. If the water temperature is not satisfied, refrigeration system No. 1 will be put into operation at 50% capacity through all the safety controls, the evaporative condenser pump and the compressor starter. As the chilled water temperature rises, system No. 2, No. 3, and No. 4 are placed in operation by the same procedure. With a further rise, each system operates at 100% capacity. When the chilled water temperature controller becomes satisfied, capacity reduction of the plant follows the reverse sequence. Even though the load fluctuates rapidly, a 2 deg variation in chilled water discharge temperature can be maintained. To eliminate frequent starting, stopping and possible voltage variation, compressors are operated at 50% capacity before any one operates at 100% capacity. This step-up in capacity has resulted in smoother operation.

Details of the refrigeration system were developed by Williard, Inc. of Philadelphia, Pa., air conditioning distributor for Westinghouse.

500 Motel Rooms Served by 89 Heat Pumps

The largest installation of packaged heat pumps in the world was placed in service in the swank Golden Gate motel-hotel project in Miami, Fla.

Eighty-nine General Electric heat pumps, with a total of 357 hp are used in the motel section of the project. They serve 500 of the 650 rooms. All units are located against outside walls of individual equipment rooms for easy access to outside air.

The Golden Gate resort is a twenty-acre tract stretching from the Atlantic Ocean to upper Biscayne Bay. It includes a 150-room hotel on the ocean and a bay colony with villas, apartments, and cottages for motoring tourists, plus shopping, bar, medical, and dental facilities. The ocean and bay sections of the resort are connected by a tunnel under Collins Avenue, famous Miami Beach resort street.

Heat pumps in multiple installation are proving particularly adaptable for motels because they switch from heating to cooling automatically, are easy to install and maintain, and because individual units can be turned off when the motel is partially occupied.

Mechanical Contractors Supply, Inc., Weathertron distributor of Winter Park, Fla., made the installation of 44 3-hp units and 45 5-hp units.

Damper Characteristics

GEORGE TH. LANG

Consulting Engineer, Buenos Aires, Argentina

Everyone knows that the damper, an elementary accessory which is present in almost every air distribution system, is used to graduate the volume of air flowing through the system. It may be interesting, however, to try to analyze how dampers behave and to what degree they perform as expected.

DAMPERS may be actuated manually or by damper motors. In either case, it would be convenient if volume regulation could be effected in such a way that volume changes might be linear along the angular trajectory of the damper. In other words, it would be desirable if the damper in middle position between totally closed and totally opened should pass half of the volume of air corresponding to the totally open position. It is generally believed that dampers really perform this way, and we often see on the positioning sectors of manual dampers the marks of ¼, ½ and ¾ of the total trajectory, with the implication that the same fractions are valid for the reduction of air volume too. However, everyone who has had to regulate air distribution systems knows from experience that this is far from true and that dampers behave in a different way.

As the resistance to air flow varies with the square of the air velocity, and the velocity at constant volume varies inversely with the free area, we are able to analyze the functioning of dampers by comparing their free areas in different positions.

In Fig. 1, two types of dampers are shown. Type A is called the parallel blade damper and is used in the great majority of systems. Type B, in which blade action is opposed, is somewhat more complicated and expensive

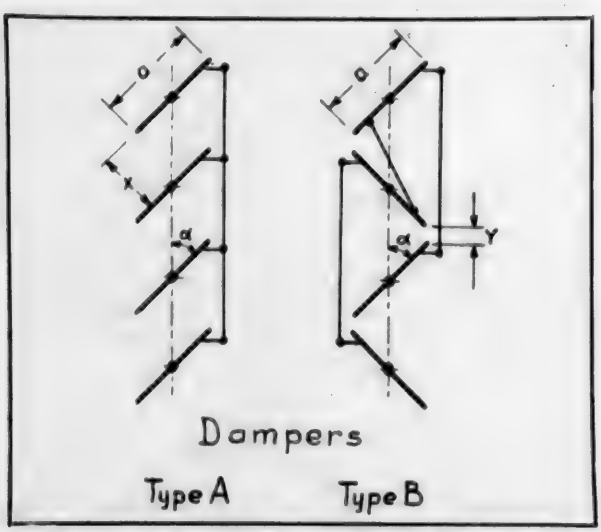


Fig. 1. Types of damper blade linkage; type A, parallel operation; type B, opposed operation.

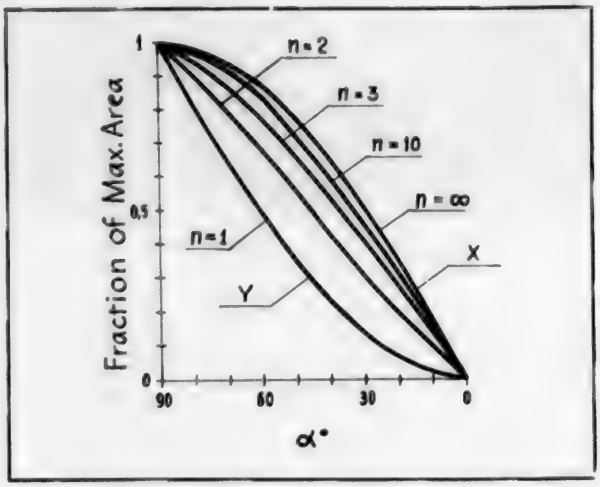


Fig. 2. Free area characteristics of dampers from wide open to shut-off. Y = opposed blade; X = parallel blade; n = number of blades; α = angle of divergence from closed position, see Fig. 1.

and in consequence does not seem to be as popular as type A.

With the type A damper of length L, the free area between any two blades is always XL, where X is the perpendicular distance between blades, and

$$X = a \sin a \qquad (1)$$

where a is the width of a single blade and a is the angle of divergence from shut position. In the discussion which follows, blades are assumed to be of unit length so that X and Y are numerically equal to the area between blades. The free area for a type B damper will be equal to YL. where

$$Y = a(1 - \cos a) \qquad (2)$$

Figure 2 shows curves X and Y which could be called the characteristic curves of the dampers. According to Fig. 1, $a = 90°$ corresponds to the completely open position and $a = 0°$ to the completely closed position. It may be seen from Fig. 2 that when beginning to close from the completely open position, the type A damper at first does not reduce the free area appreciably, and reaches the value of half of the open area only when the damper has already run ⅔ of its trajectory as sin 30° = 0.5. On the other hand, curve Y also represents a sinoidal curve but reversed as compared to X and so type B dampers when beginning to close are reducing their free area very effectively and quickly, the reduction being gradually less at the end of the damper's run.

The characteristic curve Y is valid for non-parallel dampers with any number of blades, which is not the case for the parallel damper. For instance a damper with only one blade has the characteristics of a non-parallel

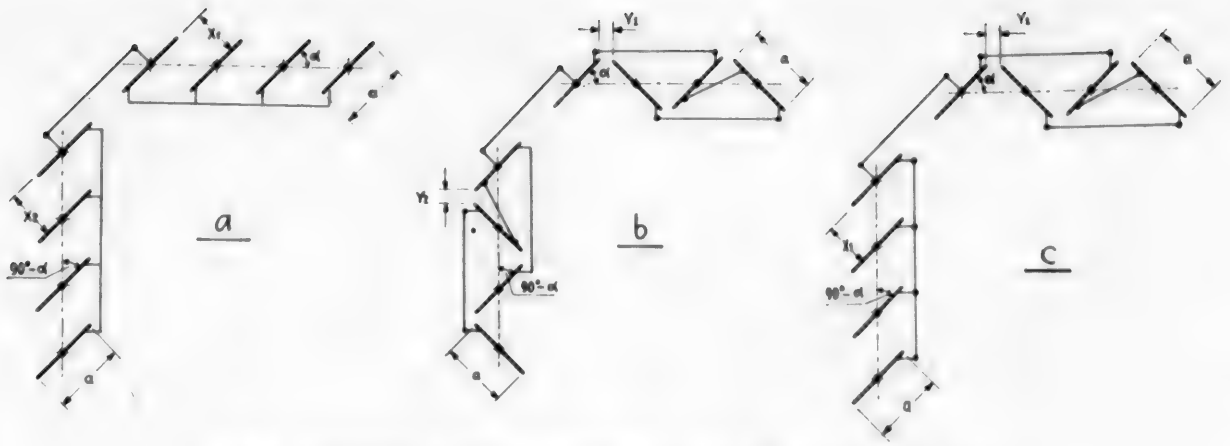


Fig. 3. Combinations of dampers arranged so that one opens while the other closes.

blade damper—curve *Y*—with half of the free area on each side. For the same reason, the two extreme blades of any parallel damper are always behaving like a non-parallel damper, each with the free area of Y/2 or totaling *Y* between the two. The characteristic of a parallel blade damper depends, therefore, on the number of blades; and with increasing number of blades approaches equation (1). Characteristic curves for parallel blade dampers with varying number of blades are shown on Fig. 2, and from this it may be seen that only with a very low number of blades does the characteristic curve differ substantially from equation (1). Parallel dampers usually have more than 3 blades and hence we may assume the validity of equation (1) for this type of damper.

In order to determine which characteristic is more favorable, it is necessary to analyze the specific function the damper may have to perform.

(1) ***Graduating the volume of air with one damper alone.*** This case occurs, for example, with an air conditioning system which uses 100% outside air and is regulated through changing the volume of air. Another and more frequent application of this case is to graduate air volume to one branch of a duct system. It would be very convenient if variation of air volume would be linear along the whole trajectory of damper movement. Taking into account the fact that static pressure loss introduced by the closing of the damper is only a part of the total pressure loss of the system, it is evident that the resistance of the damper should be as high as possible immediately after beginning to close in order to have any appreciable effect on the whole air volume. As resistance varies with the square of the velocity and velocity varies inversely with the free area, it is evident that curve *Y* will be the preferable characteristic for this case which means that the non-parallel blade damper would give the better performance. In smaller ducts a one-blade damper could be used advantageously which would give the same results.

However, the curves of Fig. 2 show that an almost linear variation of free area with angular run will be obtained by a non-parallel damper of two blades. In practice this would mean that in order to obtain this linear characteristic the damper face area should be subdivided by fixed blades placed in such a way as to leave two parallel blades between each fixed blade.

(2) ***Simultaneous graduation of two dampers which operate inversely, i.e. opening one when closing the other with a linkage which assures equal angular run for both dampers.*** An example of this is in regulating the ratio of fresh air to return air or in the case of face or by-pass dampers, etc. In these cases we do not want to introduce additional pressure losses to the system; on the contrary it is desirable that the total pressure loss should remain unchanged in order not to affect the total air volume. The function of the dampers is only to mix air which flows through two different channels.

Suppose we use two type A dampers. These two dampers move inversely so that when one reaches the position of angle α from the completely closed end the other will be in the position of $90° - \alpha$ from its completely closed end. The sum of free areas in any position for dampers of unit length will be

$$S_x = n\,(X_1 + X_2) = na \sin \alpha + na \sin (90° - \alpha)$$

or

$$S_x = na\,(\sin \alpha + \cos \alpha) = na \quad . \quad (3)$$

where n is the number of blades of unit length in each damper.

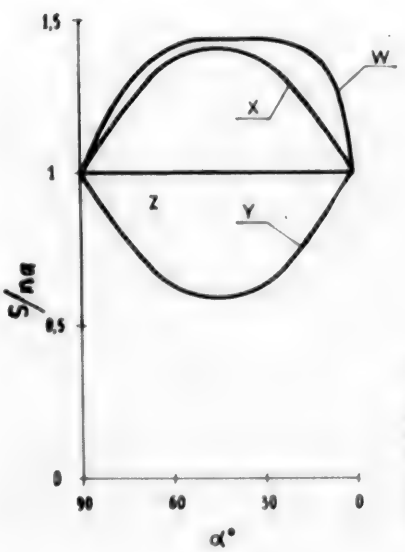


Fig. 4. Characteristics of pairs of dampers in which one opens while the other closes. X as in Fig. 3a; Y as in Fig. 3b; Z as in Fig. 3c; W as in Fig. 6.

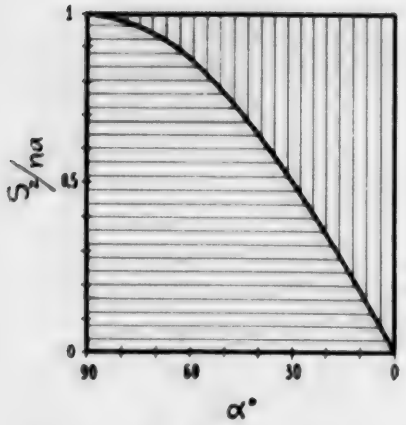


Fig. 5. Components of free area characteristic of dampers paired as in Fig. 3c.

This shows that the sum of free area in any intermediate position is always greater than the free area in any end position with one damper completely closed and the other completely open. Maximum free area is when both dampers are in midposition or $a = 45°$ where

$$\sin 45° + \cos 45° = \frac{2\sqrt{2}}{2} = \sqrt{2} = 1.41$$

It may be observed that this increase in free area is considerable and in consequence the volume of air delivered will be maximum in this middle position and minimum in both end positions of the dampers. This circumstance may have an appreciable and unfavorable effect on the correct performance of the system.

Should we take now two dampers, both of type B, the sum of the free areas will be, in a similar way

$$S_y = n(Y_1 + Y_2) = na(1 - \cos a) + na\,[1 - \cos(90° - a)\,]$$

and after substituting and rearranging

$$S_y = na[2 - (\sin a + \cos a)\,] = na \qquad (4)$$

We now have the opposite case which means that the maximum of free area will be obtained in both end positions with a considerable reduction in free area in any intermediate position.

With $a = 45°$

$$2 - (\sin 45° + \cos 45°) = 2 - 1.41 = 0.59$$

This case is even worse than the former because now in the more frequent positions of dampers we have a very considerable reduction of free area which may also cause a considerable reduction of air volume. Fig. 3a, 3b and 4 show the dampers and characteristics mentioned.

Should we now take one damper of type A and another of type B (Fig. 3c) the sum of free areas will always be

$$S_Z = n(X_1 + Y_1) = na\,[\sin a + 1 - \cos(90° - a)\,]$$

which may be written

$$S_Z = na(\sin a + 1 - \sin a) = na \qquad (5)$$

We have now a case when the sum of free areas remains constant along the whole trajectory and in any position the dampers may assume. Evidently then this combination of dampers will be the best because it will not change the pressure loss and in consequence the total volume of air delivered by the system.

After having reached the conclusion that the combination of one parallel and one non-parallel blade damper gives the best performance, we shall now have to determine which way to use this combination.

From equation (5) we see that in this combination the characteristic of the parallel-blade damper is $a \sin a$ and the same for the non-parallel blade damper will be $a(1 - \sin a)$. The area S_Z now may be represented as a constant area obtained as a result of two variable areas above and below the curve in Fig. 5.

The area below the curve represents the free area of the parallel blade damper and the same above the curve the free area of the non-parallel blade damper. It may be seen that the former always contributes the bigger part of the free area.

From this we are able to draw the conclusion that the parallel blade damper should be placed in the circuit which has the bigger pressure loss. That means that we have to place the non-parallel blade damper in the outside air duct and the parallel blade damper in the return air duct. This way a more uniform reduction is obtained along the whole trajectory of the dampers. In the same way in the case of face and by-pass dampers the face dampers should be parallel blade and the by-pass dampers of the non-parallel blade type.

Consider now the combination of two dampers but with a different linkage as shown in Fig. 6. In this case, starting from the closed position of the upper damper, during the first 45° of its run the angular run of the lower damper can be less, equal or more than the respective displacement of the upper damper, depending only on the dimensions of the connecting brackets. However, in practice, the fixed bracket of the damper blades are generally short compared to the length of the blades and in consequence, the lower damper will run less than 45° when the upper damper runs 45°. This also means that during the second 45° of the upper damper's run, the lower damper will have to run more than 45°.

Curve W in Fig. 4 shows a typical combined characteristic curve for two parallel dampers with such a linkage. It may be readily appreciated that curve W is less desirable than curve X.

We are now able to reach the following conclusion:

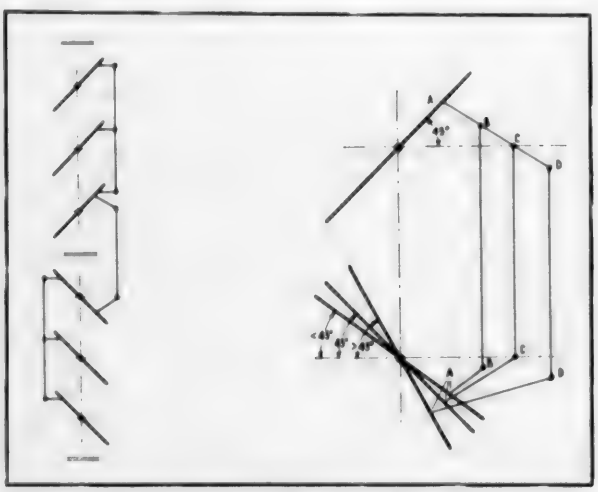


Fig. 6. Alternate linkage of parallel blade dampers.

(a) A linkage which assures that both dampers always rotate with equal angular displacement is preferable.

(b) With any linkage it is always favorable to use one parallel and one non-parallel damper.

Up to now we have considered only ideal dampers in which free area would be 0 at the closed position; in other words would close hermetically. In practice, we may be able to find such dampers only in exceptional cases. On the whole, dampers cannot be considered hermetic. This means that even in completely closed position dampers have some free area left. They could be constructed so that they close hermetically, but this is rather complicated and the much higher cost would generally not be justified.

Dampers of usual construction have clearance between the frame and blades. The influence of this clearance depends on the percentage which this free area represents compared to the total face area of the damper. This percentage is usually greater with small dampers, decreasing with the increase of the total face area of the damper. On the whole it can be estimated between 2% and 5% depending on the size of the damper and the quality of workmanship.

Generally, the blades of the damper do not interlock and leave further free area in closed position. Totalling this to the former we may reach about 4% to 10% free area in closed position.

Should these imperfectly closing dampers be placed in circuits of relatively high resistance, the influence of the defective construction will be small and even negligible when simultaneously another damper opens a circuit of lower resistance. For example, this is the case of face dampers with face and by-pass control and also in most cases of return air dampers. On the other hand, the circuit of low resistance is very much affected with the dampers not closing hermetically.

Anybody who ever tried to regulate dampers knows how difficult it is to reduce a by-pass or a fresh air intake beyond a certain limit. There have been cases where the air-conditioning system could not satisfy its design conditions, because it has been impossible to reduce the percentage of fresh air to design value.

The best thing one can do to reduce the effect of air passing through closed dampers is to try to reduce the dimension of dampers of low resistance circuit such as by-pass or fresh air. The worst one can do is to oversize them.

In any position of the dampers in two parallel paths—for instance with face and by-pass—the resistance of both paths will always be the same, because when the position of damper is changed the flow of air through the same will be altered until a new equilibrium position will be reached. Now if, for instance, a heating coil under design conditions has a resistance of say 0.2 inches, the damper by-passed air should have the same resistance. If the damper's resistance is lower it will take air away from the coil and vice versa. Let us assume for simplicity's sake that one velocity head is lost in the acceleration and deceleration through the damper—which is not true—and so the corresponding velocity for standard air would be

$$V = 4005\sqrt{0.2} = 1810 \text{ fpm.}$$

Should the resistance of the coil be 0.6 inch the corresponding velocity would be

$$V = 4005\sqrt{0.6} = 3140 \text{ fpm.}$$

These are considerable velocities and it is for this reason that the usually oversized by-pass dampers are mostly found almost closed.

Another useful precaution to take is not to select equipment which under design conditions should have a very small by-pass. In this case it is usually preferable not to have any by-pass at all but to effect capacity reduction by other means.

Artificial Well and Pump Supply Hospital Water Needs in Emergency

An ingenious water system by Magruder Pump and Supply Company permitted uninterrupted service to critical areas of the Coral Gables, Florida, Veterans Hospital for four weeks while contractors removed and replaced a roof storage tank located on the 17th floor. The tank normally supplies all water for 10th floor operating rooms, all 8th floor patients and upper floor apartments of hospital officials.

Magruder installed a 350-gallon open cypress tank in the hospital basement to act as an artificial well. City water, with pressure varying from 40 to 60 lb, filled the small open tank. A float valve governed the tank level. Installed nearby, a Deming Duplex piston pump tapped the bottom of the open tank and discharged into a 120-gallon, 250-lb tested pressure tank.

Magruder fitted the tank with pressure switch, air controls and safety valve, making it a fully automatic water system. Operating at 90 lb cut-in and 140-lb cut-off pressure, the system piped water up 17 stories to the tank room through the existing 3-inch feeder line. This line was tied in to two 5-inch mains normally fed by the large roof tank.

Magruder replaced the 1½ hp motor on the 30 gpm Deming pump with a 3 hp motor, boosting its working pressure from 50 to 125 lb. The only change made in the pump itself was installation of hard rubber valves in place of soft rubber ones. Twenty-weight lubricating oil in the pump was changed once a week.

As an added safety factor Magruder fitted the system with a 2-inch plugged tee on the pump's suction line and a 2-inch plugged gate valve on the discharge line to the pressure tank. This would have allowed the addition of another pump, if it had been necessary.

This arrangement turned out to be just insurance. The pump operated 90% of daylight hours for four weeks without failure and kept tank pressure high enough to meet the daily water demands at the hospital. Pump operation was quiet enough to satisfy hospital needs.

Fig. 1. Main room of Shaker Savings Association showing part of the egg-crate ceiling and murals, both of which would be costly to clean if it were not for electrostatic filters.

Air Conditioned Bank

Advantages of air conditioning in banks and similar business institutions are increasingly recognized. Where installation is being considered, proper emphasis should be given to the importance of air filtration and its maintenance as part of the air conditioning process.

ONE of the newest, most modern installations of air conditioning, properly combined with filtration and an automatic process that eliminates the troublesome features of manual filter cleaning, is found in the Shaker Savings Association, 16800 Kinsman Road, in suburban Cleveland, Ohio.

The importance of dust-free air on the metallic canopy suspended from the ceiling of the bank's main room shown in Fig. 1 is of special note. This canopy, hanging from beneath the fluorescent lights, is of egg crate design, with thousands of separate, two-inch square openings. Cleaning dust from each of these small-sided openings would be prohibitively expensive, both in labor and time, if it were not for the almost total prevention of dust achieved by the use of the filtration equipment.

Details

To avoid problems characteristic of manual filter cleaning methods, Air-Maze electrostatic air cleaners incorporating semi-automatic cleaning devices were specified. Outside air enters from a port on the roof, as shown in Fig. 2, and passes into a chamber where it is mixed with air to be re-used. The blend of air then passes through a pre-cleaning process utilizing screen type filters where larger dust particles cling to oil-coated wires in each filter. Cleaning of these screen type filters, required twice a year, involves washing each in a solvent, with subsequent re-dipping in an adhesive solution.

The second stage of filtration, however, provides maximum freedom from very fine dust, and even from cigar and cigarette smoke, by passing the air through a battery of electrostatic filter cells. Thirty of these cells are arranged into a filter assembly where each electrostatic cell slides in and out of its frame like a desk drawer.

At Shaker Savings, it is necessary to clean the electrostatic plates only about once a month. Yet cleaning would involve numerous problems if it were done manually instead of by a semi-automatic method.

With manual cleaning, each cell would have to be removed individually to a washing station, bathed in a solvent, re-coated, then returned and re-installed. Another manual method involves the use of a hose for the washing operation after which the remaining steps are the same. Personnel are reluctant to perform this task, both because it is so dirty and because it so often requires performance near high voltage electrical connections.

Danger from the high voltage connections is eliminated at Shaker Savings because it is possible to inspect the cells visually, yet impossible to enter the inspection area

except by unscrewing a latch which automatically shuts off the electrical current. The bolt to be unscrewed is made long enough to allow any surplus current to bleed off before the latch opens.

The installation at Shaker Savings likewise does away with the dirty job of manual washing of the cells. Instead, the custodian simply puts the semi-automatic washing mechanism into operation from exterior controls at predetermined intervals. He turns off a switch to stop the entire system; then he releases a valve which causes hot water to spray against the plates. While the water flows, he rotates a crank to direct all nozzles toward all parts of the cell area. After shutting off the water and allowing the assembly to dry, he pushes a button to spray fresh oil into the plates. Finally, he throws the main switch to resume full operation of the entire system.

Controls

When outside temperatures drop to 60 deg F, an outdoor thermostat starts the circulating pump at the boiler in the basement. Coupled with this is another control to determine the water temperature. With outside temperature at 70 deg, boiler temperature is maintained at 90 deg. At the other extreme, zero temperature outdoors is accompanied by a boiler temperature of 200 deg.

This arrangement makes heat available, but the four zone thermostats determine the quantity. Unless the amount the thermostats specify is as much as the boiler is providing at the time, a control turns down the boiler fires. The same zone thermostats also control the distribution of cooled air in summer, in a similar manner.

Other temperature controls automatically determine the proportions of the blend achieved between outside air and re-used air. These allow a minimum of 25% outside air regardless of other conditions. At certain seasons however, when outside temperatures can cool without refrigeration, then outside air intake is 100%.

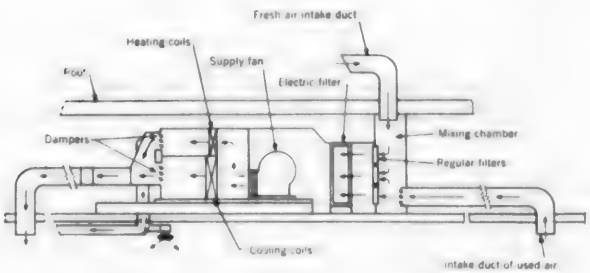


Fig. 2. Schematic diagram of air handling system.

After the blended air in the first intake chamber of the system passes through the panel filters and then through the electrostatic filters, it enters a chamber divided into an upper and lower section. In the upper are located the heating coils to carry hot water from the boiler; in the lower are other cooling coils carrying refrigerant circulated by the compressor in the basement.

Four sets of automatic dampers operated by the four zone thermostats blend air from the hot or cold decks to provide desired temperatures in each zone. However, no heat is in the heating coils when the cooling coils are operated, and conversely the cooling coils are dormant when the heating coils are functioning. Automatic shut-off controls prevent conflict between the two systems.

Final item is an independently operated space heater located in the basement and connected by a short duct to registers beneath the bank's large front windows. This heater, although served with hot water from the same boilers as the main system, is called into use by a manual control.

No extensive return air ducts are required in the building. The freely circulating air from all areas simply flows into the dominant first zone, then enters the return ducts through intake ports at the rear of the main banking area.

User reaction to the accomplishments of air conditioning in conjunction with proper filtration is exemplified by Shaker Savings' President Alexander Mintz, who has been instrumental in making this savings association one of the largest and best known in the Cleveland area.

"Our results from air filtration and conditioning have been gratifying," Mr. Mintz asserts. "An early apparent result is the fewer absences due to illness, especially colds. Another accomplishment is the protection of our facilities from bothersome and costly dust and grime. The murals in our main room are always clean, yet not at the expense and potential damage of necessary cleaning. Less cleaning is required of our draperies; there's less demand for painting, window-washing, cleaning of rugs and lighting fixtures."

Plastic Pipe on Navy Minesweeper

One of the Navy's newest minesweepers, U.S.S. Cormorant, probably has less metal in it per square foot than any other type of Navy ship. The idea is to discourage the attraction that exists between metal ships and magnetic mines.

The 144-foot hull of the "Cormorant" is made entirely of wood. Plastic pipe, high impact rigid Koroseal pipe developed by B. F. Goodrich, replaces metal pipe on the Cormorant to handle bilge, cold salt water for fire mains and cold fresh water lines. It is also used in the voice tubing.

The same material produced in sheet form has been used on the Cormorant to construct Diesel oil collector tanks and water tanks, previously made of metal, in order to reduce still further the metallic content of the ship. Both pipe and tanks have been tested under actual service conditions for more than one year aboard ship.

According to Clyde O. DeLong, president of BFG's industrial products division, high impact rigid Koroseal pipe and fittings used on this vessel are made from a special resin formula developed by B. F. Goodrich. The pipe and fittings weigh only about a quarter as much as standard steel pipe but in many services will outlast steel, copper, cast iron or stainless steel.

Aerial view looking north over the Los Angeles Civic Center. In the photograph 1 is the city hall; 2, Health Administration Building; 3, Police Facilities Building.

Year-round Air Conditioning for

Los Angeles Civic Center Buildings

RALPH E. PHILLIPS, Sr.

Member of Ralph E. Phillips, Inc., Consulting Engineers, Los Angeles, Calif.

A double duct distribution system, with air from the ducts blended to suit occupants of individual offices, serves the Police Facilities Building and the Health Administration Building of the Los Angeles Civic Center. Pedestrian type tunnels connect three buildings.

THE Civic Center of Los Angeles, Calif., has been developing the past few years as part of an extensive building program. Two marked examples of this development are the Police Facilities Building designed by the firms of Stanton and Stockwell, and Weldon Becket and Associates, architects, and the Health Administration Building designed by Lunden, Hayward and O'Connor, architects. For both buildings Ralph E. Phillips, Inc., served as mechanical and electrical engineers.

A central boiler plant not only supplies the Police Facilities and Health Administration buildings, but the existing city hall as well. The present boiler plant in the city hall was obsolete and therefore, it was decided to abandon it completely.

The new central boiler plant is located in the basement of the Health Administration Building and consists of three 339 hp high pressure, two-drum, bent tube, water wall boilers operating with natural draft, and capable of developing in excess of 200% rating. The boilers are equipped with combination fuel oil and gas burners and are fully automatic. Pedestrian type pipe tunnels connect the three buildings. Steam is distributed at 125 psi for all three buildings with reducing valve stations in each individual building to operate heating systems and other accessories with 15 psi steam. All condensate from the three buildings is returned to the central plant and pumped through the feed water heater back to the boilers. Due to the incorporation of the boiler stack in the structure of the Health Administration Building, sufficient height is available so that the entire plant can operate on natural draft.

Ralph E. Phillips, Sr. was educated at Cooper Union and Columbia University, New York City. He served in France as an officer in the 102nd Combat Engineers Regiment, 27th Division, during World War I. He was employed in the offices of Clyde R. Place and Percival Robert Moses until 1922 when he moved to Los Angeles, Calif., to supervise the mechanical and electrical construction of the Los Angeles Biltmore. At that time he established his own practice which has continued to the present date.

Health Administration Building, Los Angeles.

The Health Administration Building is the first building in the Civic Center to have complete air conditioning and is divided into numerous fan units supplying adjacent areas or individual floors. From the fan rooms a double duct distribution system serves the occupied areas, and by automatic control, hot and cold air can be blended so that any desirable temperature can be maintained in individual offices or spaces. In addition, there is a separate system which completely exhausts the air from the building after closing hours and this system is used in the fall and early spring of the year so that fresh air will be delivered through the building without the use of refrigeration. This air is controlled automatically by the outside temperatures.

Double Duct System Used

The entire building is heated and cooled through the same double duct system controlled by individual room thermostats. During winter and summer, any individual temperature condition can be maintained within an office or open space. All air is filtered before being introduced into the room, cooled by means of heat exchange coils and chilled water, and heated by steam coils. In addition, there is a separate and complete toilet exhaust system.

The refrigeration plant for air conditioning consists of two 220-ton centrifugal type compressors operating in combination with an induced draft cooling tower located at the top roof level. From the refrigeration plant chilled water is circulated to all the coils throughout the building by a reverse loop piping system. The air conditioning plant is designed to maintain 70 to 75 deg F throughout the year. Certain portions of the air conditioning system are supplied with 100% fresh air due to the nature of the areas air conditioned, as for example, the TB Culture and Virology Laboratory on the second floor, the Virus Laboratory on the eighth floor and the TB and Radiology Laboratory on the ground floor. The balance of the air conditioning is based on 75% recirculation to 100% fresh air, depending upon outside temperatures. In addition there are numerous exhaust systems for the pipe and pedestrian tunnels, garbage rooms, toilet rooms, fume hoods, laboratories, central sterilization and media preparation rooms.

Police Facilities Building

The Police Facilities Building was designed to become a central operating point for the Los Angeles Police Department. This building contains all central offices and crime laboratories, as well as a large auditorium and a two-story, maximum and minimum security jail.

Air distribution was handled as follows: The ground floor, first floor and second floor administration areas are air conditioned by a double duct system from two central fan rooms located on the ground floor. The auditorium and mezzanine office areas are air conditioned from a fan room located on the mezzanine floor. The jail section has a heating and ventilating air distribution system only. This is handled by a central fan room located on the ground floor.

The third through eighth floors are air conditioned by two double duct systems being fed from two fan rooms located at opposite ends of each floor.

All air is filtered before being introduced into the air conditioning system. After filtering, the fresh air and a proportionate amount of return air is conditioned by being passed over chilled water coils and steam coils and is then distributed through a double duct system and mixed to suit individual temperature requirements by means of a thermostatically operated pair of mixing dampers mounted on the double duct. The two sets of coils are contained in one large plenum on the discharge side of the fan; the double duct begins on the discharge side of

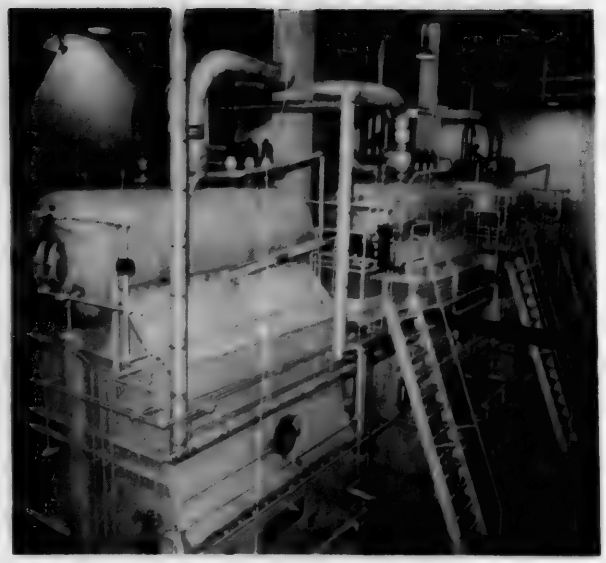
Police Facilities Building, Los Angeles

each of these coils. As in the Health Building, the chilled water coils are fed by a closed loop, reverse return chilled water distribution system. This chilled water emanates from a refrigeration plant located on the ground floor of the Police Facilities Building. The steam coils are fed by a 15 psi distribution system from the central boiler plant located in the Health and Receiving Building.

The refrigeration plant in the Police Facilities Building consists of two 400-ton centrifugal compressors with complete automatic control. Condenser water is obtained from an induced draft cooling tower located on the roof.

Design May Influence Other Projects

The city administration for Los Angeles has set a pattern by their progressive thinking in completely air conditioning the Police Facilities and Health Admnistration buildings. This procedure may have a bearing on all county, state and governmental buildings constructed in the vicinity of Los Angeles. Contemporary architectural design for modern structures make it mandatory to air condition buildings in temperate climate due to the exceptional expanse of glass and thin wall exterior construction. With modern methods of illumination, requiring high foot candle power intensity, together with the occupancy load, an unusually high heat gain is created within the building which can only be overcome by air conditioning methods.



Central boiler plant in the basement of the Health Administration Building.

The city administration of Los Angeles has commented that the elimination of street noises with closed window operation, the cleanliness of the building, and the year-around even temperature control, have materially increased occupants' efficiency, maintenance and operation.

Valve Lubricant Tested for Sub-Zero Operation

A special sub-zero chamber to duplicate field conditions was used at Rockwell Manufacturing Company's Meter and Valve Testing Station to test a newly developed valve lubricant for hydrocarbon gas lines operating at temperatures ranging from minus 50 to 120 deg F.

Tests were performed in a walk-in deep freeze icebox, composed of two rooms, a test room and an antechamber. Before entering the test room, engineers became acclimated to low temperatures in the refrigerated antechamber to prevent possible harm from a sudden and drastic temperature change. The entire system is cooled by a three-stage compressor and exhaust system which takes about five hours to reduce the temperature from 70 to minus 50 deg.

A valve lubricant is undergoing a test in a sub-zero test chamber in the testing station.

The experimental lubricant formula was tested in a 24-inch valve. A standard type valve stem packing was used and the compound gear was greased with a special low temperature gear grease. The valve was mounted in the deep freeze chamber on a fabricated steel framework for stability. Line fluid used was nitrogen, supplied from a manifold hooked up so that the gas could be directed into the valve from either flanged end. A regulator was provided to permit close pressure control.

Results of the test program indicated the new lubricant formulation gave a leak-tight seal at temperatures ranging from minus 50 deg to 70 deg. at 50 psi and 800 psi line pressure, both balanced and unbalanced on either flange. Even at minus 50 deg the operating torque was not excessive. Substitution of a specially prepared low temperature packing for conventional packing materially reduced the torque, as much as one-third at minus 50 deg.

While the test was underway, the valve was readily relubricated at minus 50 deg by a hand gun which had been brought in from an outside temperature of 70 deg.

AIR CONDITIONING HEATING & VENTILATING

Reference Section

Various Methods for Using Evaporative Condensers

J. R. HARNISH
Associate Application Engineer, York Corp., York, Pa.

Piping diagrams illustrate how evaporative condensers may be installed as a single unit, several methods for paralleling units, and how they may be used with shell and tube condensers.

AIR CONDITIONING, HEATING AND VENTILATING — JULY, 1955

Assembling an evaporative condenser at the location where it will be used.

Various Methods For Using Evaporative Condensers

Municipal regulations for the use of water-saving devices as part of a refrigeration system, have focused attention on the evaporative condenser. There are many ways that this type condenser can be used in an air conditioning or refrigeration system—single, in multiple, or in combination with a shell and tube condenser. These systems are described and the many piping arrangements illustrated.

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EVAPORATIVE condensers as part of air conditioning and refrigeration systems have become increasingly popular in recent years due to the water shortage in many urban areas. Codes in some cities have limited to smaller tonnages, the size air conditioning systems which may use once-through water cooled condensers. In other municipalities, high water and sewerage rates have encouraged the use of evaporative condensers and cooling towers as means of reducing charges.

A typical evaporative condenser and its component parts are illustrated in Fig. 1. Hot gas discharged from the compressors enters the top of a multi-feed coil. With the removal of heat as it flows through the coil, the gas condenses and its liquid is drained at the bottom of the coil from a liquid header common to all feeds. The cooling effect is accomplished by spraying water over the pipe coil and drawing a stream of air through the coil, countercurrent to the water spray. Air flow through the unit is limited so that the cooling effect is essentially brought about by vaporization of water from the surface of the coil. Water is retrieved in the drain pan and recirculated through a spray header to the coil by a pump. A water eliminator, located between the spray nozzles and the induced draft fan, separates the liquid particles from the air stream and returns them to the coil.

This type of condenser requires makeup water only to replace the small amount evaporated. Approximately ¼ lb of water is required per ton of refrigeration versus

about 8 lb or more per ton on a once-through type shell and tube condenser.

Factors That Influence Size

Evaporative condensers are rated for capacity on the basis of the design wet bulb temperature for the area in which they are to be installed. The dry bulb temperature has no bearing on their selection since the heat pickup is principally by the evaporation of water. If condenser ratings are not available to the user, the manufacturer or supplier can select the proper size unit when furnished with the following information:

1. The locality of the installation (or the design wet bulb temperature for this area).
2. The type refrigerant to be used.
3. The design evaporative temperature or pressure. (This determines the heat rejection per ton of refrigeration.)
4. The desired condensing temperature or pressure. (Compressor capacity curves or tables are helpful as they may permit rebalancing the system at a slightly higher condensing temperature, resulting in the use of one size smaller evaporative condenser.)

Evaporative condensers may be installed in a system as a single unit, in multiple, or in parallel with a shell and tube condenser. Certain engineering principles should be applied to each type of installation to obtain optimum system performance. Careful consideration should be given, to provide that the condensing coils drain properly for liquid hang-up will greatly reduce the heat transfer surface, increase the compressor motor brake horsepower, and will withhold liquid refrigerant needed in the evaporator.

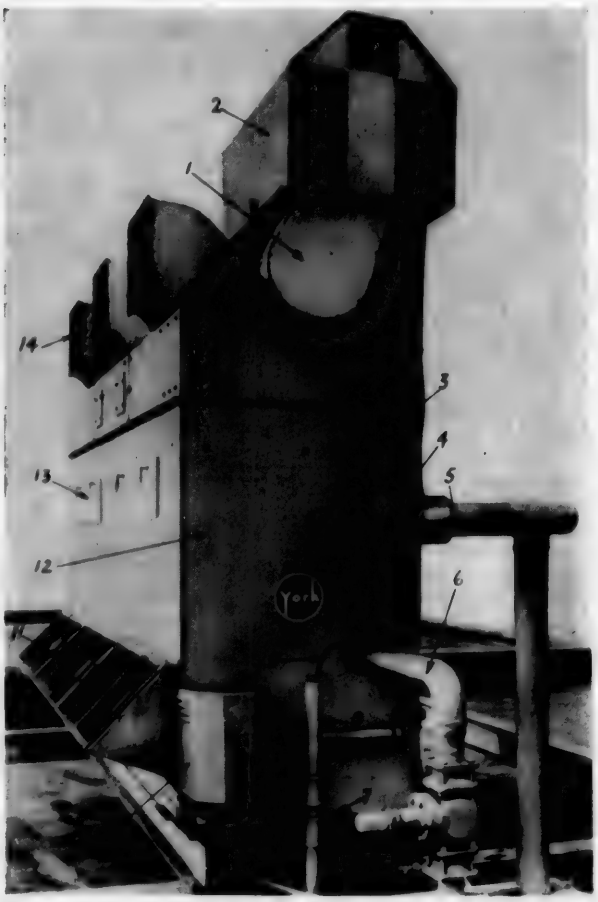

Fig. 1. A typical evaporative condenser. The component parts are: 1, fan shaft; 2, fan motor housing; 3, water eliminator section; 4, water inlet to spray header; 5, refrigerant gas inlet; 6, refrigerant liquid outlet; 7, water drain; 8, line to sewer; 9, water bleed-off line; 10, water circulator; 11, air inlet; 12, condensing coil section; 13, access door; 14, air discharge.

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TABLE 1—CONDENSER TO RECEIVER LIQUID LINES

Pipe Size	Freon-12 capacities in Total Pounds Per Minute	
	100 FPM Velocity	150 FPM Velocity
⅜ E.H.	7.7	11.5
½ E.H.	12.8	19.2
¾ E.H.	23.6	35.5
1 E.H.	39.4	59
1¼ E.H.	70.2	106
1½ E.H.	96.5	144
2 F.W.	184	276
2½ F.W.	262	394
3 F.W.	404	606
4 F.W.	606	910
6 F.W.	1575	2370

E.H.—Extra heavy steel pipe. F.W.—Full weight steel pipe. The Safety Code for Mechanical Refrigeration ASA B9.1-1953 requires extra heavy pipe for refrigerant liquid lines 1½ in. and smaller; full weight pipe may be used for lines 2 in. and larger.

A high pressure receiver should be used to drain the evaporative condenser coils and to accommodate the fluctuation in refrigerant charge. The operating high pressure receiver should be large enough so that 80% of the receiver volume will hold the full operating charge of all condensing coils plus any variation in the evaporator charge. The extra 20% volume is for expansion of the liquid refrigerant at higher temperatures. On some installations it may be desirable to size the receiver to hold the entire plant charge to facilitate system pump-out. The actual refrigerant operating charge in the condensing coils is a function of the amount of condensing that is taking place. The higher the condensing rate, the greater will be the operating charge. The full load operating refrigerant charge of an evaporative condenser will generally fall between 10 and 25% of the internal coil volume, depending upon the design of the unit. Nominal operating charge information will usually be provided by the manufacturer.

The receiver should be equalized to some part of the system high side so that gas pressure can be relieved and liquid can drain into it freely. The receiver can be equalized either through the liquid inlet or through an external equalizing line. When equalized through the liquid inlet, this line may not be trapped and its size should be large enough to obtain sewer type drainage. When the liquid drain line from the condenser is trapped in any way, an external equalizer should be connected to a higher point in the system. The exact location, determined by the ap-

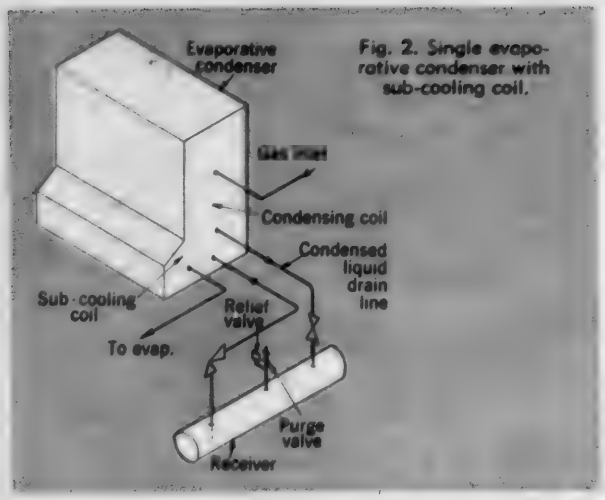


Fig. 2. Single evaporative condenser with sub-cooling coil.

plication, is very critical and reference should be made to each method, discussed later, for the proper spot.

Some units are provided with liquid sub-cooling coils to increase the plant capacity and to provide sub-cooled liquid to the expansion valves. See Fig. 2. Liquid from the condensing coil should drain to the receiver before flowing through the sub-cooling coils, obviously to effect a liquid seal and to prevent blowing gas through the sub-cooling coil; the latter would provide a condensing surface and little sub-cooling.

SINGLE EVAPORATIVE CONDENSER APPLICATION

For single unit operation, economics will usually justify the use of a free draining liquid line to the receiver as shown in Fig. 3. This line may not be trapped in any way and should be pitched ¼ in. per foot or more toward the receiver throughout any length of horizontal run. It is recommended that the pipe size be selected for a maximum liquid velocity of 100 fpm (feet per minute) at the full load flow rate.

Table 1 shows line sizes for liquid velocities of 100 and 150 fpm. Under the 100 fpm condition, the line will operate partially full of liquid and gas will be permitted to equalize back through it. If a valve is located in this line, its elevation should preferably be at least 10 inches below the liquid outlet of the coil to assure a static head above the valve to provide good drainage. Otherwise, the static head may build up in the condensing coil. The action of the liquid build-up above the valve, sometimes referred to as "glugging," may be likened to that of pouring liquid from a jug with a narrow neck. This action will not always occur, but it is prudent to make the elevation allowance for it to prevent such a contingency. Any valve in this line should be positioned with the valve stem horizontal to prevent liquid from damming upstream from it.

A purge valve should be connected to the top of the receiver to periodically purge the system of air and other non-condensable gases. During operation, any non-condensables in the low side will be drawn into the compressor, compressed and forced through the condensing coils to the receiver, due to the high gas velocity. The liquid seal in the receiver traps these non-condensables and their concentration will become the highest at this point. Purging should take place while the system is in operation. When the plant is shut down, the air is completely diffused and running water spray over the coils will not concentrate it enough to warrant using this method. If purged to the atmosphere, the ratio of refrigerant lost by this method versus that of purging during operation, is approximately 3 to 1.

TABLE 2—METHODS FOR PARALLELING EVAPORATIVE CONDENSERS

Method No.	Description
1	Paralleling evaporative condensers of any size
2	Paralleling evaporative condensers using a top inlet type receiver
3	Paralleling evaporative condensers with evaporative condensers and a receiver on same floor level
4	Parallel evaporative condensers with both units in operation at the same time

In Figs. 2 and 3, and in some of the other drawings, a relief valve is shown with the purge valve. The ASA B9.1-1953 Code requires that two relief valves (or a bursting disc and a relief valve in parallel) be provided on high pressure receivers with a gross internal volume greater than 10 cu ft. For smaller volumes, a single relief valve may be used. In all the illustrations, only a single relief valve is indicated.

MULTIPLE EVAPORATIVE CONDENSER APPLICATIONS

The use of two or more evaporative condensers on a system presents some rather complex problems and must be treated entirely separately from the single unit application. Most multiple condenser systems will be required to operate at reduced compressor capacity on days of relatively light loads. During these periods, the total high side equipment is oversized and it is desirable to turn off one or more units to maintain adequate head pressure to actuate the liquid control valve. Shutting off some of the units will also reduce the electrical operating cost.

The essential requirement for part-load operation of multiple evaporative condensers is that sufficient vertical height be provided in each trapped liquid drain line to allow refrigerant to back up in it to balance the effect of refrigerant pressure drop in the condenser without backing

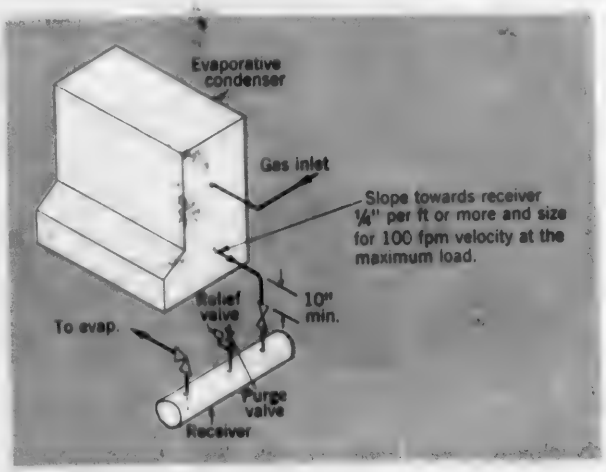


Fig. 3. Single evaporative condenser and receiver.

TABLE 3—EQUALIZER LINE PIPE SIZE

Pipe Measurement	Maximum Freon-12 Refrigeration Tons				
	70	120	200	280	460
	Equalizer Line Pipe Size, Inches				
I. P. S.	¾	1	1¼	1½	2
O. D. C.	⅞	1⅛	1⅜	1⅝	2⅛

up liquid in the condensing coil. When liquid refrigerant does back up in the condensing coil, a considerable quantity is required to overcome a small pressure drop penalty.

Trapped liquid drain lines require an external equalizer from the receiver to a higher point in the system, the exact location being determined by the specific application. These are discussed in each of the methods to follow, as listed in Table 2. Care should be taken to avoid undersizing an equalizing line. Gas may flow in either direction through the equalizer, particularly when the refrigerant liquid control valve is opening or closing, and too much restriction may impair the ability of the receiver to drain the condensing coils properly. Table 3 shows suggested equalizer line sizes as determined by the system tonnage. It gives the outside diameter copper lines and iron pipe sizes to be used for the same tonnage. On many jobs copper is used for the smaller size lines due to the ease in installing.

Figure 4 is a schematic illustration showing the necessity for trapping liquid drain lines on multiple evaporative condenser installations. One unit is shown in operation while the other is idle, as is likely to occur during periods of light system loading. With the compressor discharging gas at a pressure of 125 psig and the receiver equalized to the gas inlet line, the pressure at the receiver liquid level would also be 125 psig. In calculating the trapping height required, any pressure drop along the route of flow between the two points of equalization should be considered. Assuming a pressure drop of 1 psi through the gas shut-off valve and 6 psi through the condensing coil, the total pressure drop would be 7 psi, neglecting the small pressure drop through the short length of line and the fittings. Since 22.7 in. of Freon-12 is the equivalent static head of 1 psi pressure drop, the trapping height required between the coil outlet and the operating liquid level in the receiver is $7 \times 22.7 = 159$ in. If the 159 in. of trapping height were not available as in Fig. 4,

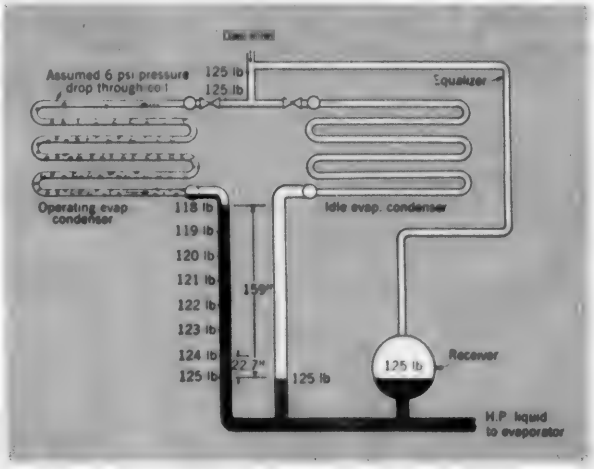


Fig. 4. Function of trapped evaporative condensers.

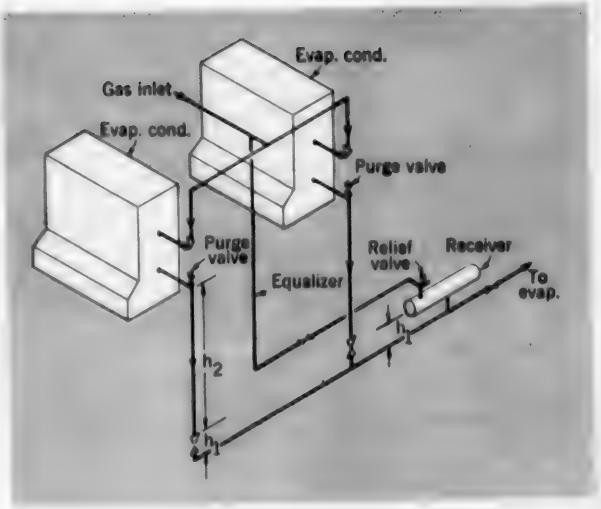


Fig. 5. Method 1, parallel evaporative condensers.

large quantities of liquid would build up in the condensing coil.

Observe that there is no gas flow through the idle condensing coil since, with fan and water pump motors not operating, no condensing takes place. Therefore, the pressure throughout its coil is the same as that entering the operating evaporative condenser and as a result, a liquid column will stand in its drain line at the same height as that in the receiver. When the idle unit is again put into operation, the liquid column in its drain line will rise to a point corresponding to its pressure drop. The trapping height for each unit will be determined by its size and correspondingly, the pressure drop through it. The pressure drop at the design conditions and load should be obtained from the manufacturer. The 6 psi pressure drop in this example is an extreme condition. Normally, the pressure drop will be less. Any pressure drop in the gas and liquid lines between the two points of equalization should be included in calculating the total amount of trapping height required. This would include a shut-off valve normally used in each liquid drain line although not shown in Fig. 4.

By observing Fig. 4, it can be seen that the receiver should be equalized to the gas inlet to the evaporative condenser, rather than the outlets, if either unit is to be shut off while the other remains in operation. Free draining both outlets, or equalizing to one outlet, would create a higher pressure in the receiver than would be available at an operating coil outlet, since the compressor discharge pressure would equalize through the idle unit.

This illustration is for a system where either evaporative condenser is to be shut off at reduced compressor loads. Should multiple units be used on a system with a constant load, such as an industrial process, it may not be necessary to shut off any one unit while the others are in operation. This, of course, also depends upon the locality and its wet bulb temperature variation. Where the condensing load and wet bulb temperature are fairly constant, it is not necessary to provide long trapping heights and the arrangement discussed in Method 4 may be used satisfactorily.

There are several methods of applying parallel evaporative condensers to a system. The method to be used on

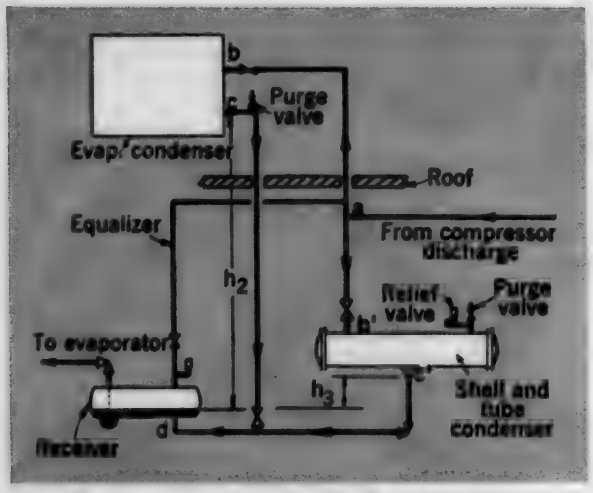


Fig. 6. Evaporative condenser and shell and tube condenser in parallel draining to a bottom inlet type receiver.

an individual job will usually be dictated by the amount of load fluctuation, the outside air condition variation, physical conditions such as head room, and condenser location with respect to receiver. Basically, there are four approved methods of applying them, each of which has its advantages and disadvantages.

Method 1

Figure 5 shows a satisfactory arrangement for paralleling evaporative condensers of any size. The primary requisite is that sufficient vertical height be provided between the condensing coil outlets and the liquid level in the receiver to allow the liquid build-up in the drop leg to effect a seal and to counter-balance the coil pressure drop, along with any shut-off valves, without backing up liquid into the condensing coils.

Before laying out a system, the pressure drop through each size evaporative condenser to be used should be obtained from the manufacturer for the load conditions. To this must be added any pressure drop through gas and liquid shut-off valves between the receiver and the point of equalization. The total pressure drop, multiplied by 22.7 in. Freon-12 static head per 1 psi, will give the trapping height h_2 required between the coil outlet and the highest expected operating level in the receiver. Although in common practice the largest unit with the higher pressure drop in a parallel combination will determine the minimum h_2, it is only necessary that each condenser be trapped for the pressure drop through its own circuit. If it is known that the system will be expanded in the future by adding an additional compressor, sufficient trapping height should be allowed for the maximum loading expected.

The receiver gas equalizing line should be connected to the gas entering side of the condensing coil. When the evaporative condensers are of equal size, the equalizer should be connected to a point from which the pressure drop will be about equal to all condensing coils.

Shut-off valves in the coil liquid drain lines should be located at the lowest elevation possible with respect to the receiver. This is desirable to minimize flash gas which can reduce the suction effect and counteract the advantage of the static head imposed by the liquid traps.

When an evaporative condenser is connected to a system in parallel with a shell and tube condenser, either of the arrangements shown on Fig. 6 or Fig. 8 (Method 2) can be used. Figure 6 shows such an arrangement with a bottom inlet type receiver. The trapping height h_2 between the operating level in the receiver and the evaporative condenser liquid outlet should be determined by the pressure drop along circuit *abcd*. Dimension h_3 is the elevation difference between the bottom of the vortex eliminator (if provided) on the shell and tube condenser and the operating liquid level in the high pressure receiver. This height is determined by the pressure drop along *ab'c'd*. The pressure drop through a shell and tube condenser is principally the entrance and exit losses at the gas inlet and liquid outlet, respectively.

The size of the liquid drain lines for any of the Method 1 arrangements is not critical in itself, but a small line will cause an appreciable increase in pressure drop, which increases trapping heights. A drain line sized for about 150 fpm liquid velocity is the general practice. Thus sized, the pressure drop will be within reason and the cost of the system will not be increased by using unnecessarily large pipe.

Method 2

Another method of paralleling evaporative condensers

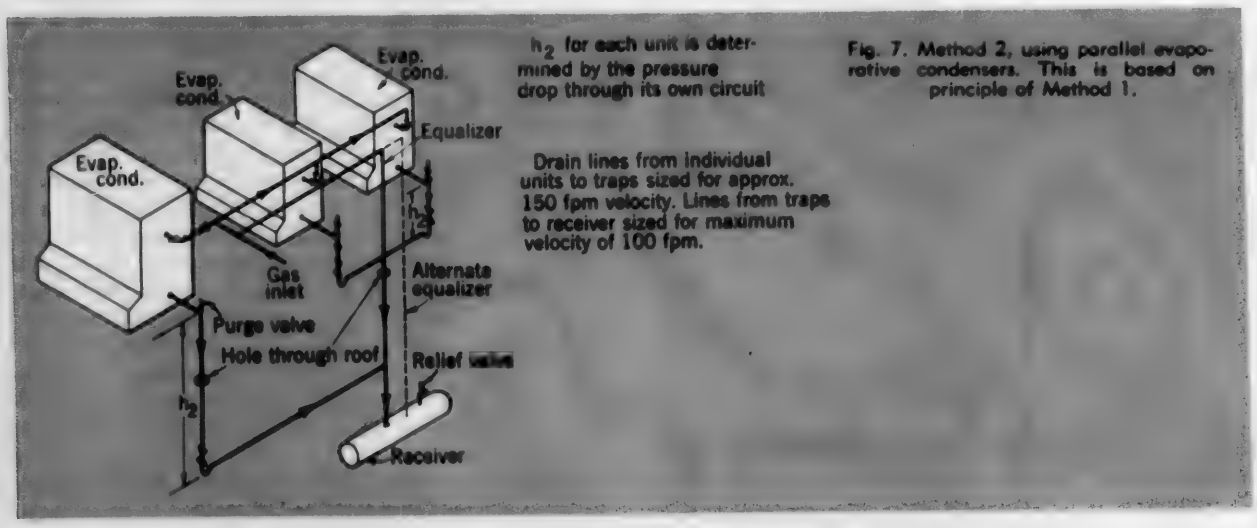

Evap. cond.
Evap. cond.
Evap. cond.
Equalizer
h_2
Gas inlet
Alternate equalizer
Purge valve
Hole through roof
Relief valve
h_2
Receiver
h_2 for each unit is determined by the pressure drop through its own circuit
Drain lines from individual units to traps sized for approx. 150 fpm velocity. Lines from traps to receiver sized for maximum velocity of 100 fpm.

Fig. 7. Method 2, using parallel evaporative condensers. This is based on principle of Method 1.

with properly trapped liquid lines is shown in Fig. 7. This method is based on the same principles as Method 1, except that a top inlet type receiver is used and the liquid drain lines are trapped before entering a horizontal header.

This arrangement can be used when another evaporative condenser is added to an existing system with a top inlet type receiver. It has the added advantage of possibly reducing the number of holes in the roof required for the individual drain lines where the receiver is placed on a floor below the evaporative condenser level. This can be observed in Fig. 7 which shows one large and two small units tied into one system. In this particular case the trapping height required for the two smaller units permits tying the individual drain lines into a common line above the roof requiring two holes through the roof instead of three.

The trapping height h_2 between each coil outlet and its respective horizontal drain header is determined by the pressure drop throughout its circuit from the point of equalization to the horizontal header. A trap should be provided at each vertical drain line as it enters the header. The trap loop may be as small as possible since it is only necessary to provide a liquid seal. When any condenser is in operation, a column of condensed liquid will form in its trapped vertical drain line to counteract the pressure drop through its circuit. The vertical column will form to the necessary height to balance the effect of pressure drop. When h_2 is properly determined, the liquid column will not back up into the coil itself and steady flow conditions will be achieved.

The gas equalizer should be connected to the common gas inlet to all units at one end, and to either the receiver or top of the common liquid drain line at the other. It is suggested that the individual liquid drain lines from the coils to the header be sized for a velocity of about 150 fpm. The horizontal drain headers and the common vertical drain line should be selected to obtain sewer type drainage, about 100 fpm velocity at the maximum flow rate.

When an evaporative condenser is added to an existing system containing a shell and tube condenser and a top inlet type receiver, it can be piped in the manner shown in Fig. 8. Individual liquid drain lines are trapped into the bottom of the common horizontal drain header and sized as discussed previously. The trapping height h_2 for the evaporative condenser is found by computing the pressure drop along circuit *abcd*; the shell and tube condenser trapping height h_3 will correspond to the pressure drop along circuit *ab'c'd*. In each instance, the pressure drop multiplied by 22.7 inches Freon-12 per 1 psi will provide the necessary trapping height in inches. Either the receiver or the horizontal drain header should be equalized to the common compressor discharge line.

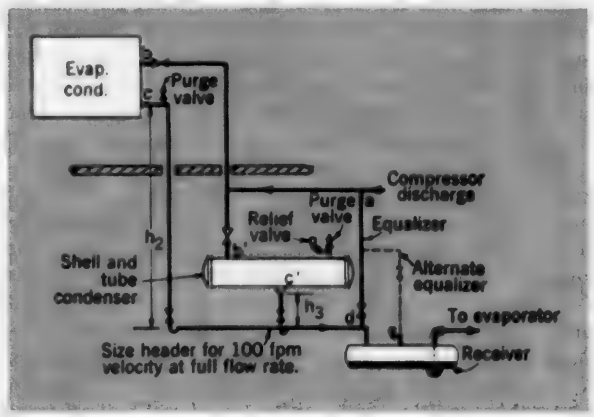


Fig. 8. Shell and tube and evaporative condensers in parallel draining to a top inlet type receiver.

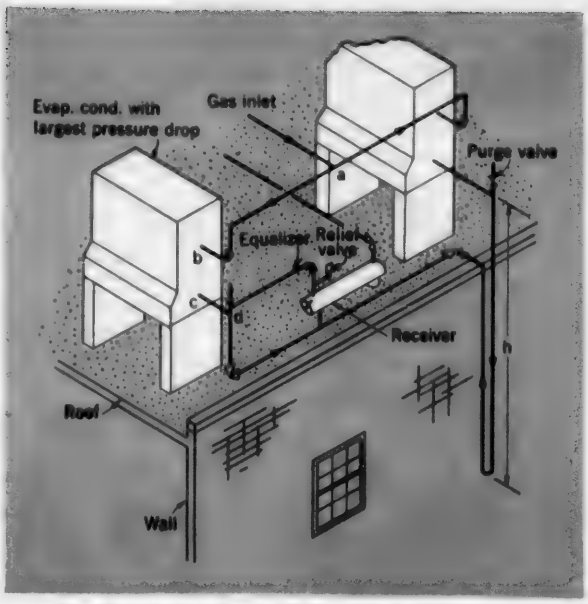


Fig. 9. Method 3, parallel evaporative condensers.

Method 3

On some installations, the physical limitations may necessitate locating several evaporative condensers and the receiver on the same floor level. If sufficient trapping height is not available to use either Method 1 or Method 2, the arrangement shown in Fig. 9 may be adaptable and still obtain flexibility at reduced load operation. The liquid drain lines from the units to be shut off for reduced capacity are trapped over the side of a building, through a hole in the floor, or in a posthole in the ground to a depth determined by the pressure drop through the largest condensing coil. The receiver should be equalized to the liquid outlet of the evaporative condenser with the largest pressure drop. The latter unit should always be the lead condenser, unless its drain line is also trapped and equalizers, each containing shut-off valves, are connected to both it and the outlet of an equal size evaporative condenser. To change the operating sequence, the shut-off valve in the equalizer to the new lead unit should be opened and all others should remain closed.

The theory of this arrangement is that the receiver pressure, when equalized to the unit with the largest pressure drop, will remain equal to or below that of each unit outlet. The U-tube effect in each loop will permit a liquid column to adjust itself to the outlet pressure of its respective condensing coil. When the unit is shut off, the compressor discharge pressure, minus any line losses, will exert itself on the liquid column, causing it to drop to an elevation where the static head in the receiver opposing it will be in balance and the liquid seal will not be broken.

Each drain line, except that on the lead condenser, must be trapped the same minimum distance h which is deter-

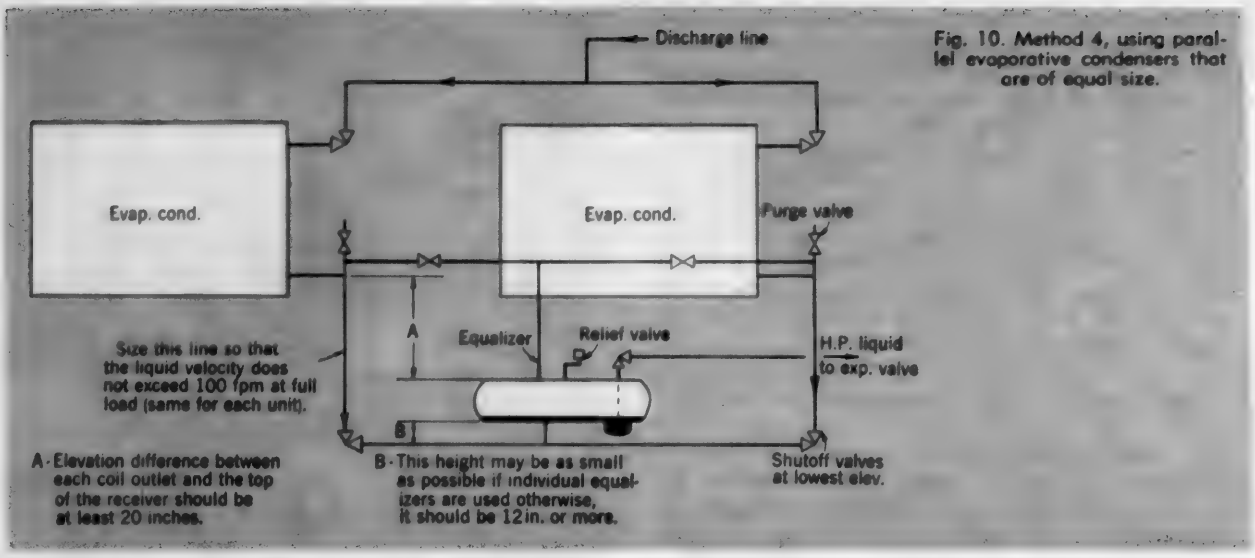

Discharge line
Evap. cond.
Evap. cond.
Purge valve
A
Equalizer
Relief valve
H.P. liquid to exp. valve
Size this line so that the liquid velocity does not exceed 100 fpm at full load (same for each unit).
B
A - Elevation difference between each coil outlet and the top of the receiver should be at least 20 inches.
B - This height may be as small as possible if individual equalizers are used otherwise, it should be 12 in. or more.
Shutoff valves at lowest elev.

Fig. 10. Method 4, using parallel evaporative condensers that are of equal size.

mined by the pressure drop along circuit *abcd*, Fig. 9, of the largest unit. The actual dimension *h* used should be increased slightly over the calculated figure to avoid the possibility of blowing the U-tube clear at any time. The calculated *h* in inches equals 22.7 inches per psi times pressure drop through the circuit *abcd* of the largest evaporative condenser.

The top of the receiver should be at least 20 in. below the liquid outlets of the largest units to provide sufficient static head to overcome any pressure drop in the drain lines. The size of these lines should be large enough to hold the pressure drop to a minimum.

Method 4

Although Methods 1, 2 and 3 should be satisfactory for most cases, there will be some installations where the necessary liquid drop leg length cannot be obtained. Method 4, Fig. 10, is only recommended for applications where all the evaporative condensers are the same size, and if all the units remain in operation when any compressor is running. *A water circulator and/or fan motor should not be shut off unless done for all units simultaneously.* One unit should not be shut down while another remains in operation because the compressor discharge pressure will equalize through the idle unit and hold up liquid in the operating coil, since there will be no pressure differential across it to provide adequate flow. Some method of head pressure control should be applied to all units simultaneously unless the condensing load is relatively constant. The disadvantage of this arrangement is that the electrical operating cost will be higher since two or more fan and water circulator motors are required to be in operation at light compressor loads.

Large size condensing coil liquid drain lines, preferably sized for about 100 fpm velocity, should be used to minimize the pressure drop since the trapping height is extremely limited. These lines should be trapped into the bottom of the receiver. Free draining liquid lines entering the top of a receiver are not recommended since no two coil constructions are exactly identical; consequently, the pressure drop through them will vary slightly and trapping them as shown in Fig. 10 can compensate for a difference of a pound or more. The top of the high pressure receiver should be at least 20 in. (dimension *A*) below the liquid outlet of each unit to allow for this difference.

It is suggested that the receiver be equalized to the liquid outlet of each evaporative condenser and a shut-off valve provided in each equalizing line to isolate individual units. Arranged thus, the valve in the equalizer to the unit with the lower pressure drop, as evidenced by the liquid line temperature, should be opened and the others closed. When individual equalizers are included, the elevation *B* between the bottom of the receiver and the horizontal liquid drain line may be as small as possible. If only a single equalizer, dimension *B* should be a minimum of 12 in. since it is impossible to ascertain, before installation, which unit will have the larger pressure drop.

Another advantage of individual equalizers is that each condensing coil can be valved off from the system during the in-between seasons when the cooling requirements are light. Only by valving off an evaporative condenser, should the fan and water circulator motors be shut off while another unit remains in operation.

Location of Purge Valves

Purge valves should be located at the highest point in the liquid outlets of each condensing coil whenever the liquid drain lines are trapped, as is necessary for multiple unit operation. Any air or non-condensable gases in the system will wash through the condensing coils and collect in the individual drain lines. The liquid seal in these lines prevents the non-condensables from flowing to the receiver as occurs on the free-draining top inlet type.

When the high pressure receiver draining the evaporative condenser is located in the sun, some refrigerant may boil off when the system is not in operation and condense in the discharge piping in the colder compressor room. "Not in operation" means that no compressor is functioning. The refrigerant gas in the condensing coil and discharge line piping would be maintained at a pressure corresponding to their ambient air temperature. When the high pressure receiver is exposed to the sun under this condition, some of the liquid will boil off from the receiver and migrate through the discharge line to the equipment room, normally at a lower temperature. This

gas can then condense in a large and lengthy discharge header. If the various loops and traps shown in Fig. 11 were not provided, this condensed liquid would be free to drain into the compressor discharge manifold. Large quantities of liquid here are undesirable due to possible damage to the compressor when it is again placed into operation.

A discharge loop may be included in a system for this condition as shown in Fig. 11. This loop should be as deep as practical, extending to the floor if possible. The loop provides a U-tube effect in addition to adding storage volume for the condensed liquid. The individual risers from the compressors to the horizontal header should be looped above the header as shown to prevent condensed liquid from draining into the compressor and will, in addition, utilize the full storage volume of the header.

On multiple condenser systems, the head pressure can be controlled by increasing or decreasing the number of units in operation, if the drain lines are trapped properly as discussed in Method 1, 2 and 3. To control a single evaporative condenser, or for capacity reduction below that of the smallest unit, dampers are recommended in the fan discharge duct, actuated by an electric or pneumatic motor regulated by a proportioning type modulating pressure controller. The pressure element should be connected to the gas inlet of the evaporator condenser. When the refrigerant drain lines cannot be trapped sufficiently on a multiple condenser system as discussed in Method 4, the dampers should be controlled simultaneously on all units with one pressure controller. Otherwise, one unit may do more condensing than another. The damper blades should be galvanized and the damper linkage and bearings made of stainless steel and brass to offset corrosion caused by the humid air continuously blowing over them. Dampers on the air inlet are not recommended because when the dampers are in the nearly closed position, the sharp reduction in air flow may cause water carry-over through the eliminators.

Another acceptable head pressure control arrangement is to bypass some of the air from the fan discharge to the air entering side of the condenser. A modulating pressure controller, actuated by condensing pressure, can be used to control the bypass dampers.

Cycling the spray water circulating pump to control the head pressure is not recommended because the constant wetting and drying of the hot condensing coils forms heavy encrustation on the pipe or tube surface and reduces the heat transfer coefficient.

Solids in Water

An efficient operating system requires that the condensing surfaces be kept clean. The outside surface should be kept free from scale, caused by mineral deposition, and organic growths such as bacteria and algae. If permitted to become excessive, these formations will materially reduce the heat transfer coefficient. Poor heat transfer will raise the condensing temperature, thus increasing the electrical operating cost and possibly overloading the compressor motor. Organic growths may also cause trouble by forming obstructions in the water distributors and nozzles, causing inadequate spray distribution over the condensing surface.

Most water contains soluble minerals such as calcium salts, magnesium salts and iron in variable amounts.

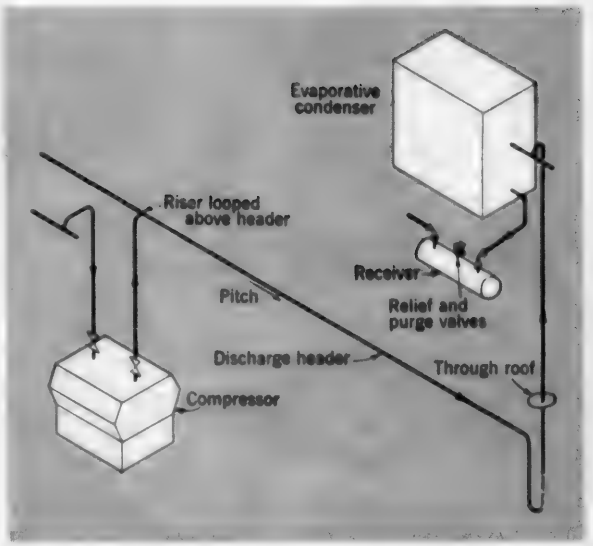


Fig. 11. Discharge line condensate loop for receiver location in sun.

Water without such mineral content (soft water) is not ideal as it accelerates corrosion.

A rise in water temperature on the condensing tubes reduces its capacity to carry these minerals in solution and, coupled with the increase in content due to evaporation, they are deposited out. Part of the deposit adheres to the tube surface, forming scale. Well water is generally higher in mineral content than surface water.

Materials in suspension include mud, sewerage and other foreign materials found in surface water, and fly ash and miscellaneous dust from the air usually caused by exhaust air and gases from factory processes. Generally, such material forms a soft deposit that is not difficult to remove.

Slime growths are the result of bacteria and algae picked up from the air circulating through the units. They may be green, brown or gray in color and may be mixed with scale or rust.

To minimize the concentration of these deposits, some water should be bled off to the sewer from that continuously circulated over the condensing coils. A small pipe containing a hand throttling valve should be run from the discharge line of the circulating pump to the sewer to accomplish the desired bleed-off. The amount of bleed-off required varies with the locality and should be determined by the condition of the water and circulating air. Where the conditions are extremely bad, the water should be chemically treated. Samples of the water can be sent to many of the manufacturers of evaporative condensers or companies specializing in water treatment for an analysis to determine whether or not chemical treatment should be used.

Winter Operation

On many industrial installations it is necessary to operate a refrigeration system the year-round. When evaporative condensers are located outdoors, there is a problem of preventing water freeze-up during winter operation. Draining the water from the unit and operating dry during the coldest part of the year will materially reduce the available condensing capacity. For instance, a

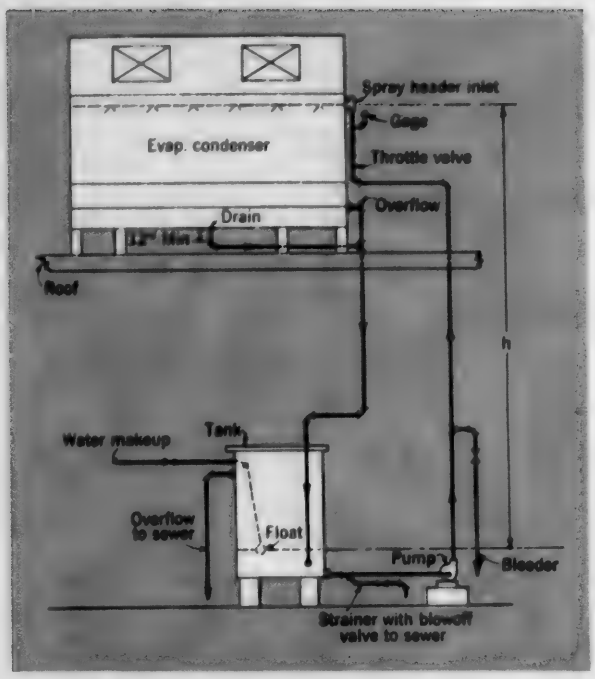


Fig. 12. Water piping for winter operation of evaporative condensers.

unit selected to operate at 40 deg evaporator temperature and 100 deg condensing temperature, and capable of 50 tons at 78 deg wet bulb temperature, would only provide 34 tons when operated dry at 35 deg dry bulb entering air. Usually on industrial applications, the refrigeration required is chiefly for the product, lighting and people loads, which are not affected by the outside air conditions. In these cases, the load will not vary appreciably throughout the year, so the unit is required to operate with the water spray during the winter.

For winter operation of an evaporative condenser located outside, a remote sump tank can be located indoors, in a heated area, to drain the water from the unit coils and pan. Figure 12 shows such an arrangement. The condensing pressure should be controlled by an automatic throttling air damper or similar means. As long as the unit is in operation, the heat given off from the condensing refrigerant will prevent freezing of the water. On shut-down, the water on the condensing coils and in the pan will drain to the remote sump tank in the heated area. For this arrangement a separate water pump should replace the standard water circulator normally furnished with the evaporative condenser. A check valve should not be located in the pump discharge line so that water in the riser and header can drain back through the pump to the tank on shut-down and prevent freezing in these lines. If a check valve is used, a hole should be drilled in the flapper or an external bleeder returned to the tank to drain these lines on system shut-down.

Note in Fig. 12 that the water bleed-off line should be connected to the pump discharge line at an elevation above the overflow connection on the tank to prevent continuous bleed-off of the water when the pump is idle.

Sizing the Tank

The remote water tank should be sized to accommodate, between the float make-up elevation and the overflow level, the total water quantity tied up in the lines, header, water pan and on the coil surface. With the tank undersized, large quantities of water will spill to the sewer each time the water pump is turned off. The most likely source of error in calculating the tank size is that of the quantity of water accumulating in the evaporative condenser drain pan. This water depth is determined by the vortex action at the water drain from the bottom of the pan. It is suggested that the drain line from the bottom of the pan be sized for a velocity of 100 fpm or less to a point at least one foot below the pan before reducing to the smaller return line size. This will minimize the water quantity that is held up in the drain pan during pump operation.

An installation which uses two methods for cooling the condenser water.

Steam Consumption Cut 49.5% by Room Controlled Heating

STANLEY MacMICHAEL
District Sales Manager, Iron Fireman Corp., Wadsworth, Ohio

Heating system for an office building, which permits great flexibility in temperature control through individual room thermostats and modulated heat flow, results in large steam consumption saving over existing design.

A STEAM heating system which permits individual room control, was instrumental in achieving a 49.5% cut in steam consumption in the Everett Building, Akron, Ohio. This building, erected in 1870, is one of that city's oldest landmarks and, up to this year, had been heated with a one-pipe low pressure steam radiator system employing a single thermostat and a motorized valve to control the temperature for the entire building. The central steam distribution system of the Ohio Edison Company supplies steam to this building.

Tenants of the Everett building provide a variety of occupancy and their heating requirements are not uniform—for example, the examination rooms of a doctor's suite required a higher temperature than the waiting room, or some of the other offices in the building. As a result, most of the tenants were dissatisfied with their existing method of individual temperature control. This consisted of opening or closing the radiator valves or opening and closing the windows.

To correct this condition and permit each of the tenants to select the exact temperature desired in each room in the building, an Iron Fireman SelecTemp heating system was installed.

Description of Units

The system consists of individual recessed room units as illustrated in Fig. 2. Each unit has a fan operated by a steam turbine, a heat exchanger for discharging the heat from the steam, filter for cleaning the air delivered, and a non-electric type thermostat on the unit for governing the action of the unit so that the room is heated at the proper temperature.

A small copper tube ¼ in. I.D., delivers steam to a steam-operated turbine. The blower and turbine are mounted on the same stainless steel shaft. From the turbine chamber, the steam travels to the automotive type copper heat exchanger. Condensed steam from the heat

Fig. 1. New heating system with individual room control was installed in the Everett Building, Akron, Ohio.

SelecTemp heating unit installed in the Everett Building. At the right is the unit with the front cover removed to show component parts.

exchanger returns by gravity to the steam boiler or, as in this instance, to the district steam company's condensate meter.

Air is drawn through the lower louvers, is filtered through a removable, spun glass filter, is heated as it passes through the heat exchanger, and is discharged through louvers at the top of the unit.

An interesting point about this design is the non-electric type thermostat which controls the delivery of heat to the room. Even though the electric service in the building may be disrupted, the heating system and its controls continue to function. The thermostat has a range from 40 to 90 deg F. A modulating valve controls the flow of steam that drives the turbine and fan, thus regulating both the fan speed and the heat output. The speed of the fan varies according to the heat output demanded by the thermostat. The unit operates between slow and full speeds to supply a continuous flow of heat varying from approximately 1/20th to maximum output capacity. When heat requirements are less than 1/20th of the unit capacity, it operates on a continual "on-off" cycle.

The building owners report complete tenant unit satisfaction with their modernized heating system. Temperature recordings made in one of the offices, showed a variation in temperature of less than one degree during a 24-hour period of severe weather.

In addition to the tenants being so highly pleased with their ability to select the exact temperatures they desired, the owners were greatly pleased with the report they received from the Ohio Edison Company indicating a reduction in steam consumption of 49.5% compared to a similar degree day period prior to the installation of this system.

A direct comparison of steam consumption in this building shows that for the month of March, 1954, with 843 degree days, 365,000 lb of steam were used, or 0.433 thousand pounds steam consumption per degree day. With the new system in operation during the month of March, 1955, which had 946 degree days, the steam consumption was 206,000 lb, or 0.218 thousand pounds of steam per degree day. This represents a saving of 0.215 thousand pounds of steam per degree day, or 49.5% reduction in steam use.

The record of steam consumption as it was related to degree days was compiled by R. C. Wilson, supervisor of steam sales and distribution, Ohio Edison Company.

Additional advantages reported were greatly improved cleanliness and appearance, also a major reduction in floor space occupied by the small compact heating units compared with the large cast iron radiators.

In adapting the SelecTemp heating system to this building, the existing one-pipe steam distribution system was utilized as the return piping system.

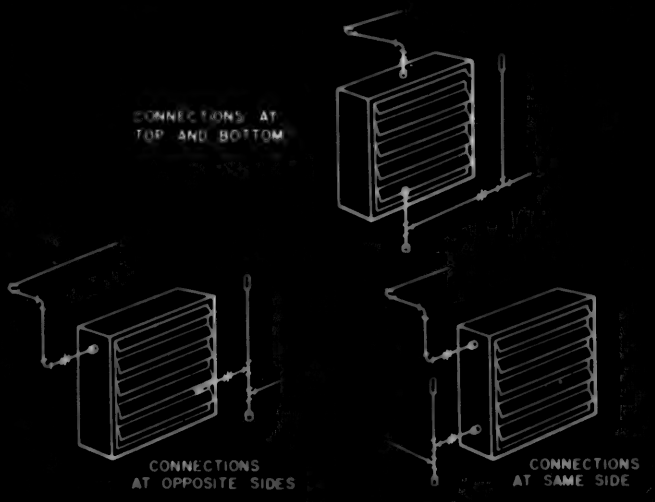
A new steam supply system was installed, using small diameter copper tube. A high pressure main carrying steam at 40 psi pressure was extended through an old elevator shaft to the attic of the fifth floor. At this point the steam pressure was lowered through a reducing valve to a suitable pressure of 8 psi for distribution throughout the building.

Fig. 3. Higher room temperatures, through individual control, are possible in the examining room of a physician's office.

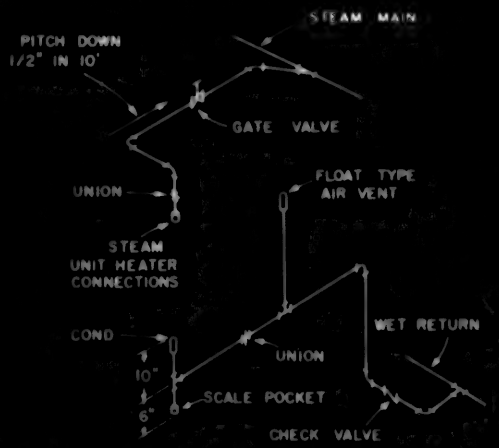
Fig. 4. Interior view of one of the offices to show how unit occupies little of the wall space under the window.

UNIT HEATER PIPING CONNECTIONS

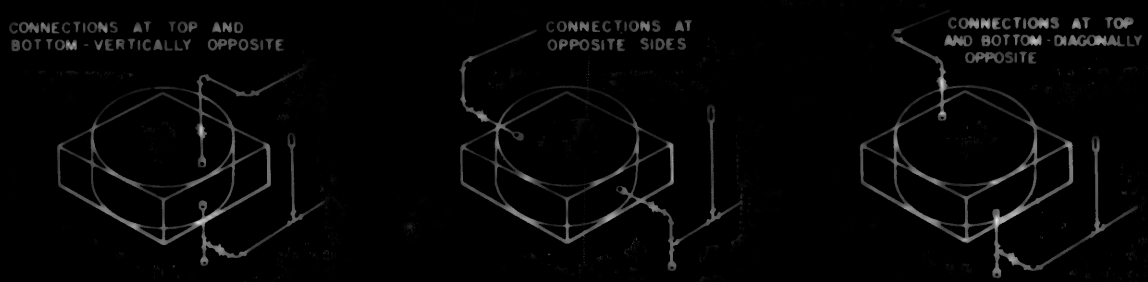
STEAM SUPPLY—LOW PRESSURE—1 TO 15 PSIG.
CONDENSATE—RETURN TO BOILER BY GRAVITY



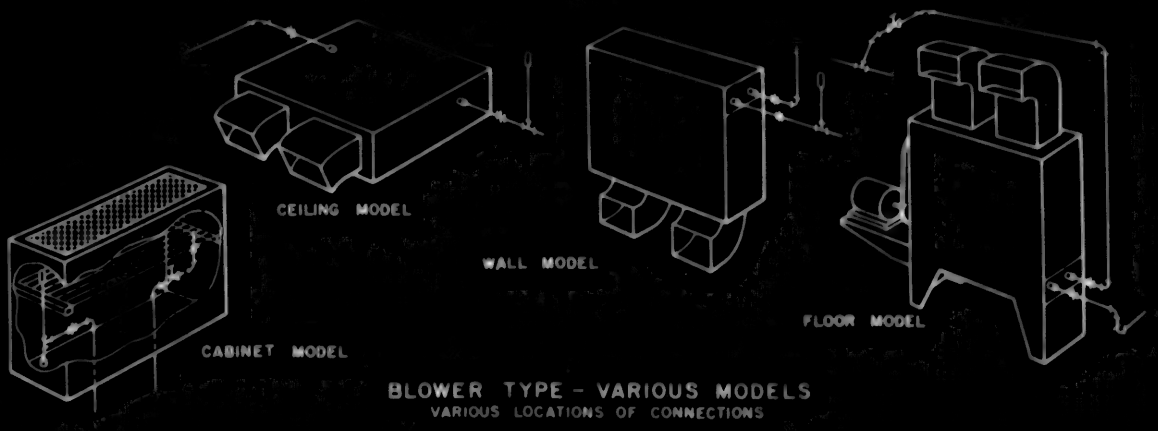
PROPELLER TYPE HORIZONTAL DISCHARGE
VARIOUS LOCATIONS OF CONNECTIONS



TYPICAL PIPING AND SPECIALTIES FOR ALL MODELS AND TYPES
LOCATIONS OF STEAM AND CONDENSATE CONNECTIONS VARY


CONNECTIONS AT TOP AND BOTTOM - VERTICALLY OPPOSITE
CONNECTIONS AT OPPOSITE SIDES
CONNECTIONS AT TOP AND BOTTOM - DIAGONALLY OPPOSITE

PROPELLER TYPE – CIRCULAR AND SQUARE MODELS VERTICAL DISCHARGE
VARIOUS LOCATIONS OF CONNECTIONS



BLOWER TYPE – VARIOUS MODELS
VARIOUS LOCATIONS OF CONNECTIONS

LOCATIONS OF CONNECTIONS VARY WITH MANUFACTURERS STANDARDS

AIR CONDITIONING, HEATING AND VENTILATING

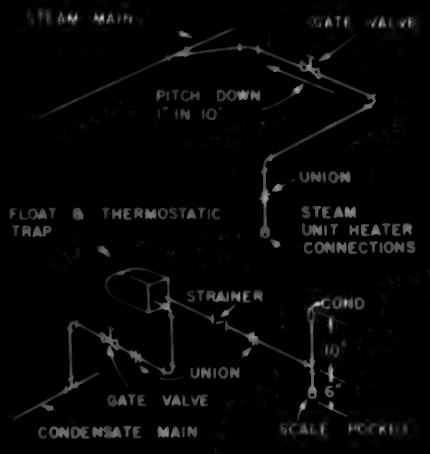
DETAIL SHEET

JULY 19

CUT ALONG THIS LINE

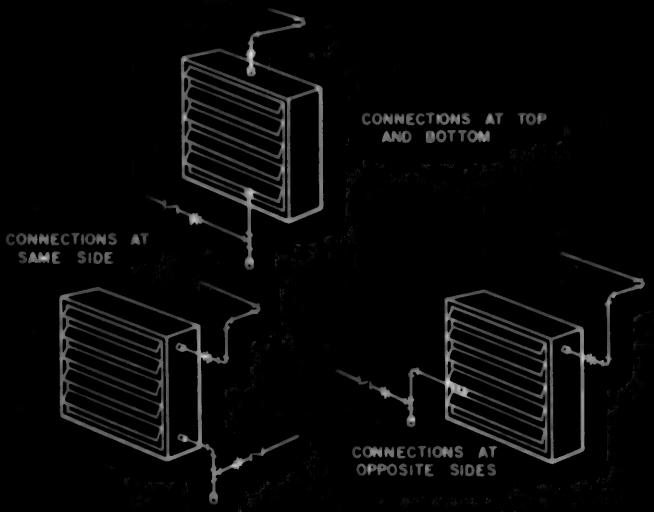
UNIT HEATER PIPING CONNECTIONS

STEAM SUPPLY—LOW PRESSURE—1 TO 15 PSIG.
CONDENSATE—RETURN TO RECEIVER OR VACUUM RETURN PUMP



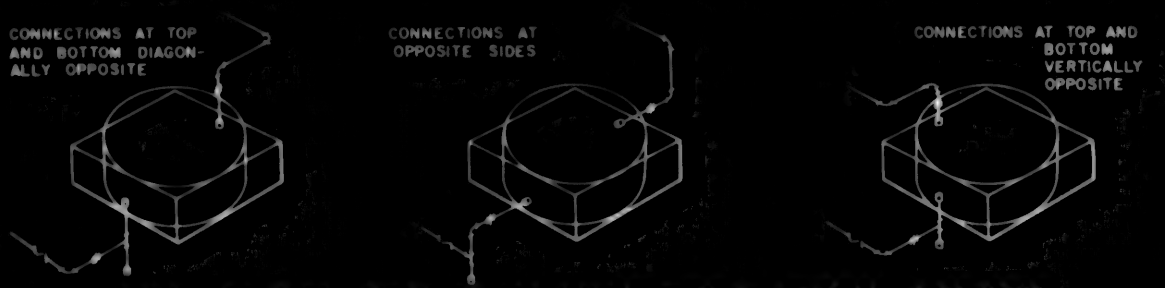
TYPICAL PIPING AND SPECIALTIES FOR ALL MODELS AND TYPES

LOCATIONS OF STEAM AND CONDENSATE CONNECTIONS VARY



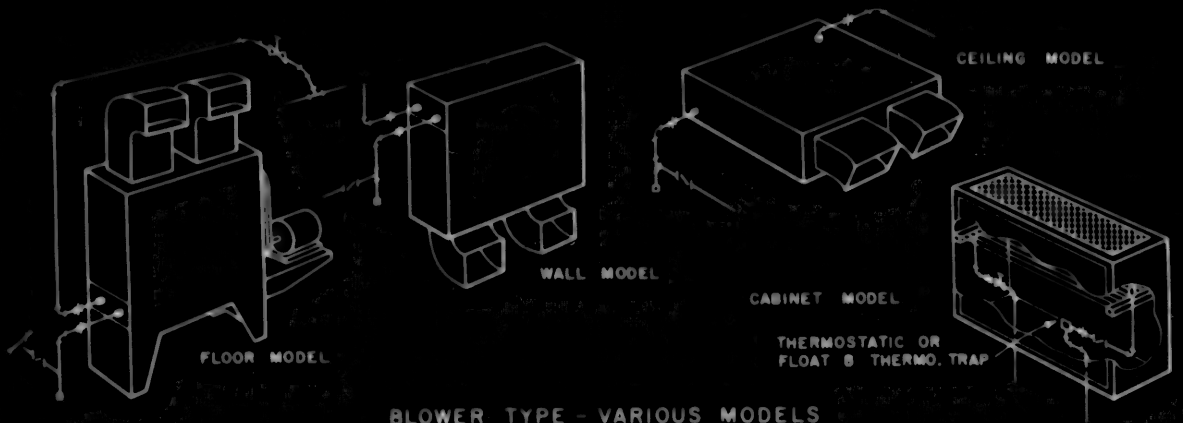
PROPELLER TYPE - HORIZONTAL DISCHARGE

VARIOUS LOCATIONS OF CONNECTIONS


CONNECTIONS AT TOP AND BOTTOM DIAGONALLY OPPOSITE
CONNECTIONS AT OPPOSITE SIDES
CONNECTIONS AT TOP AND BOTTOM VERTICALLY OPPOSITE

PROPELLER TYPE - CIRCULAR AND SQUARE MODELS - VERTICAL DISCHARGE

VARIOUS LOCATIONS OF CONNECTIONS



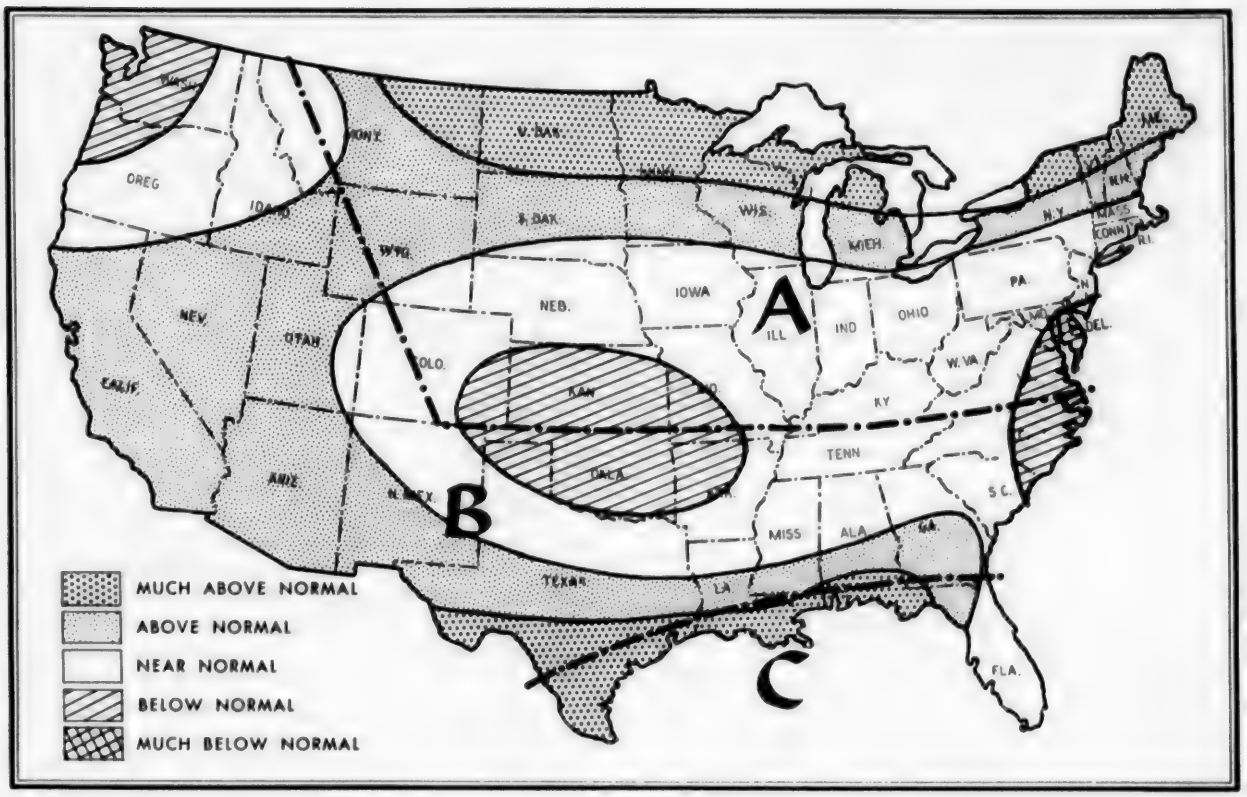
BLOWER TYPE - VARIOUS MODELS

VARIOUS LOCATIONS OF CONNECTIONS

COURTESY THE INDUSTRIAL UNIT HEATER ASSOCIATION

Temperature Forecast for July

Prepared for Air Conditioning, Heating and Ventilating by Long Range Weather Consultants



KEY BY REGIONS

	A	B	C
MUCH ABOVE NORMAL	+4° or more	+4° or more	+3° or more
ABOVE NORMAL	+2° to 3°	+2° to +3°	+1° to +2°
NEAR NORMAL	+1° to −1°	+1° to −1°	0°
BELOW NORMAL	−2° to −3°	−2° to −3°	−1° to −2°

THE summer weather has become established in a rather stable pattern of air mass movement which changes the outlook for July somewhat from that which was anticipated in the spring. This pattern indicates during July the persistent movement of cool air from the Pacific into the central part of the country, hence somewhat lower temperatures in that area than were indicated previously. For July temperatures near to moderately below the normal are expected to occur in the far Pacific northwest, particularly in western Washington and Oregon, in the central Plains and middle Mississippi Valley, particularly in Oklahoma, Nebraska and western portions of Missouri and Arkansas, and along the middle Atlantic coast and in southern Florida.

Temperature moderately above normal will occur in central and southern sections west of the Divide, and from southern Texas eastward to Georgia and northern Florida, with much above normal prevailing in a narrow strip from extreme southern Texas eastward along the Gulf coast to northwest Florida. Temperature moderately above the July normal is expected also eastward from the Divide through the Dakotas, Minnesota, Wisconsin, Michigan, up state New York and northern New England, with much above normal averages in northernmost sections from central Montana eastward across the upper Lakes to extreme northern New England.

LOUIS BLENDERMANN ON

PIPING AND PLUMBING

Fixture Roughing for Low Rent Housing Projects

THERE will always be a demand for low rent housing projects of the type now being erected in great numbers throughout the country. This class of apartment house has significant importance because it provides modern living quarters for families in the low-income bracket. As a result, many slum areas have been cleared and in their place, now stand, handsome structures with spacious grounds. The benefits gained from this type of project are many, including a higher standard in living conditions, playgrounds, trees and most of all, a finer sense of community spirit.

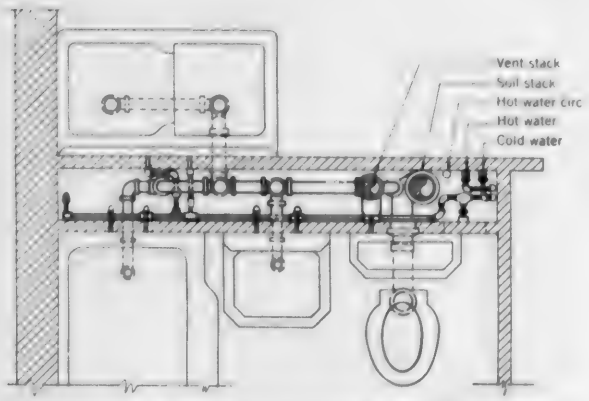


Fig. 1. Plan of typical arrangement of fixtures and piping.

Since low rent housing projects are financed for the greater part by federal funds, economy in construction is a necessary consideration. Economy, however, is a broad term and should receive careful interpretation. Economy does not mean that cheap and often inferior materials or equipment can be installed. Rather, economy, means that the best possible plumbing systems be provided for the least possible cost. This requires careful planning for the project.

Various features of design are described that should be included in the minimum requirements of good plumbing systems.

Typical Layout of Toilet and Kitchen Fixtures

Usable floor space is the prime factor in each apartment. Therefore, the bathroom, although it may be limited in size, should contain all the necessary facilities. A typical arrangement for such fixtures is shown in Fig. 1. As illustrated in this figure, the kitchen and toilet room fixtures are installed on either side of a common pipe space with the minimum of spacing between the fixtures. The gas or electric range, depending upon which one is most economical to operate in the particular area, is generally installed next to the sink. The range as well as the

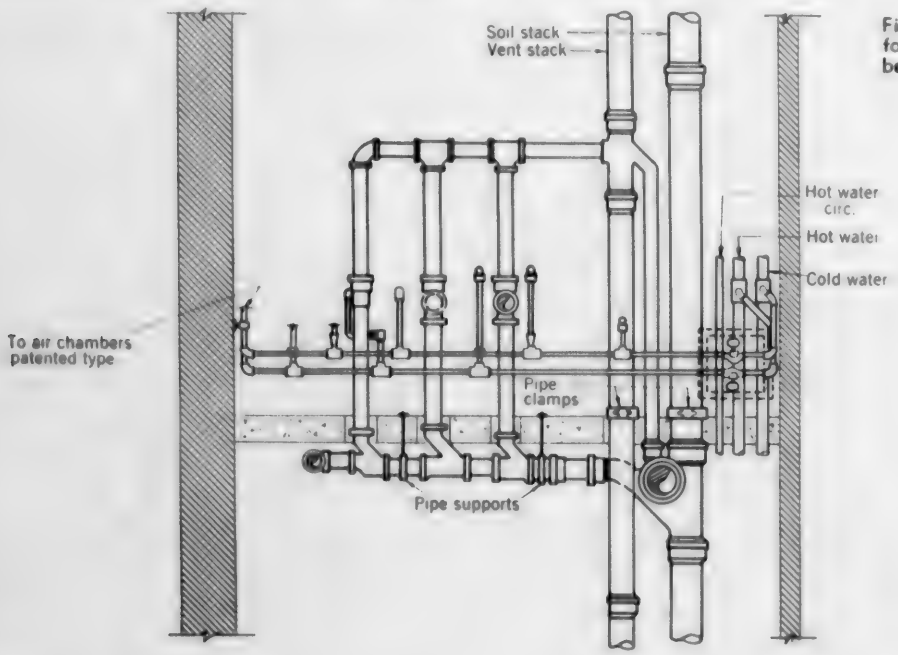


Fig. 2. Elevation showing the roughing for fixtures. A patented type air chamber is recommended for this installation.

service connections have not been shown because this subject merits more thorough discussion. This subject will be treated another time.

Minimum Pipe Space Requirements

Referring to Fig. 1, it will be noted that all the vertical and horizontal piping is contained within a 10 in. pipe space. This is the amount of space generally required for the installation of the piping. If it is possible, a 12 in. pipe space should be provided for ease of installing the roughing.

Typical Elevation of Required Roughing

The roughing for the kitchen and toilet room fixtures can be installed in a number of different ways and of varied materials depending upon the preference of the engineer and contractor and the requirements of the local code. A system offered only for the purpose of example is shown in Fig. 2.

The soil and vent stacks consist of a patented system of piping and fittings as manufactured by the Central Foundry Company. However, conventional pipe and fittings of the caulking or threaded type can be used equally well. Other patented systems of pipe and fittings may also be used. Galvanized wrought iron or galvanized steel of the threaded type has been shown for the branch waste and vent piping. Again, other selection of materials are also acceptable. The water piping to be installed is usually specified of material that best withstands the corrosive action of water.

The pipe supports shown in Fig. 2 are quite important and have been placed at specific locations to prevent sagging of lines thereby eliminating the danger of leakage and escape of foul odors. The branch water lines are offset near the connection to the vertical risers. The offsets provide flexibility to compensate for the expansion and contraction of the vertical risers.

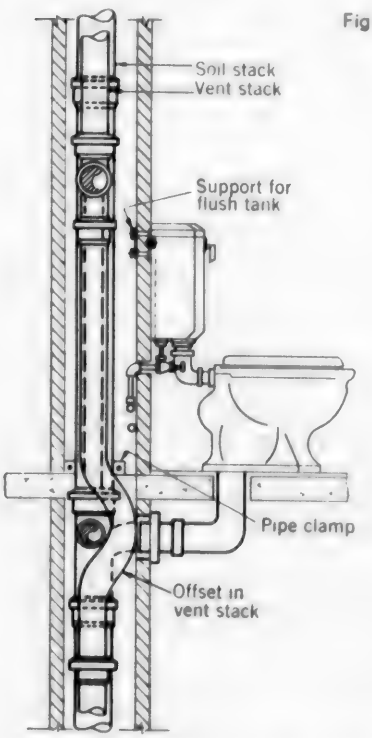


Fig. 3. Roughing for a water closet.

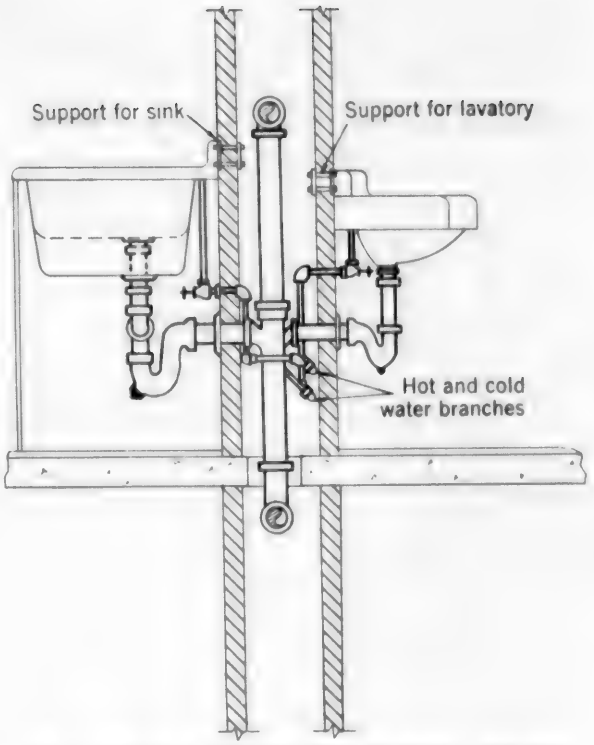


Fig. 4. Sections of typical roughing for lavatory and sink.

Water Control Valves

Valves are needed to control the water branches. It is always economical to install quality valves at this point rather than to replace valves of lesser quality, after a few short years. Often, control valves are installed in the pipe space with just the stem and valve handle projecting through the finished wall. This is not good practice because all parts of the valve should be accessible for inspection and repair. As a result, if the need would arise, a hole would have to be chopped in the wall to reach the rest of the valve. It is better practice to furnish a small access door and frame of say 8 in. by 8 in. to ensure the ease of inspection or repair.

Cuts in Floor Slab

In Fig. 2, it will be noted that cuts have been provided in the slab for the installation of the vertical piping. Whether or not a full cut will be provided in the slab within the confines of the pipe space, or cuts just large enough for the passage of the piping, is a condition that should always be discussed with the structural engineer. Normally, just cuts are furnished by the structural engineer to maintain strength of slab construction.

Typical Sections of Fixture Roughing

In order to point out various considerations related to the roughing for the water closet, lavatory, sink and bathtub, the following illustrations are used.

Figure 3 illustrates the floor type water closets which are generally installed in low rent housing projects be-

cause they are considered more economical. The flush tank should be carefully supported because the finished wall of these structures are of lightweight construction. Therefore, steel plates bolted together on either side of the wall support the tank. The steel plates distribute the

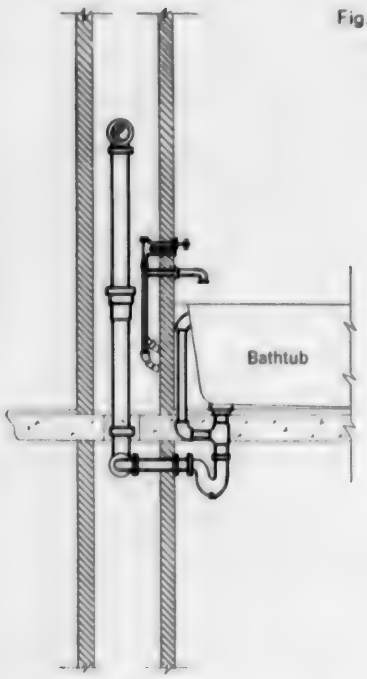


Fig. 5. Section of roughing for a bathtub.

weight load over a larger area rather than at a concentrated point.

The conventional lead bend or other patented device is installed under the slab but is exposed in the toilet room below. This installation does not lend to a neat appearance or add to the degree of sanitary cleanliness in the toilet room below. A partially furred ceiling would hide the exposed roughing but because of the additional expense involved, is not usually included. This is a point where economy could be expanded a bit.

Use of Valves

It will be noted that steel plates are also utilized for the support of the lavatory and the kitchen sink, as illustrated in Fig. 4. Control valves have been included on the hot and cold water supplies to each fixture. These valves are often omitted. However, they do save considerable maintenance time when faucet washers are replaced and are quite helpful for adjusting the proper amount of water desired at each fixture. Such valves bear a little further consideration since repair or maintenance time is also a form of economy in the operation of a low rent housing project.

Roughing for the bathtub is shown in Fig. 5. The P-trap is installed below the slab and is exposed in the toilet room below. Moreover, since the cleanout plug is located at the bottom of the trap, it becomes necessary to clear any stoppages from the apartment below. If the bathtub waste piping and all the other piping for that matter is carefully reamed before it is assembled there will be much less possibility of stoppage.

Projected Economy

The various factors of economy in construction have been covered. Certain features have been added or recommended which add to the cost of construction. These

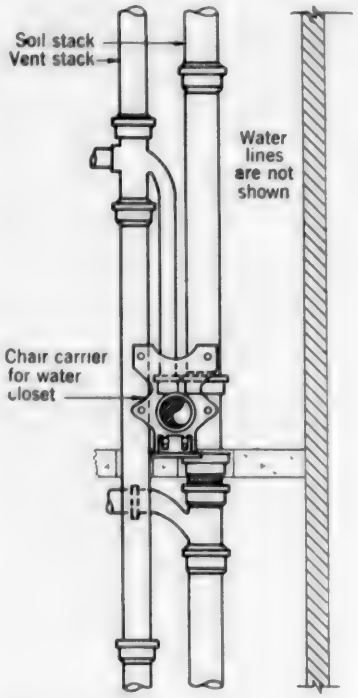


Fig. 6. Typical roughing for a wall-hung water closet.

added features, however, will also reduce the required maintenance time. Economy, therefore, cannot be measured in terms of the cost of construction alone for cost of maintenance time must also be considered. When both considerations are weighed, a favorable balance should result. This balance represents the true picture of economy. It must be remembered that all items added or deducted in low rent housing projects are multiplied in cost by 100 to several thousand units depending upon the size of the project.

Other Housing Projects

Many privately owned projects are being erected with kitchen and toilet fixtures installed in a similar manner to that shown for the low rent housing projects. The illustrations shown for the low rent housing projects will therefore also apply to the privately owned projects. If wall hung water closets are desired, the required roughing would be similar to that illustrated in Fig. 6.

As detailed in Fig. 6, the soil and vent stacks have been modified to include the necessary chair carrier for the siphon jet water closet. In addition, the diameter of the cold water supply lines will have to be increased proportionately in order to furnish ample water for the flush valves.

Many variations in arrangement or type of fixtures is possible with the basic roughing system. The important consideration, however, is that the systems be durable, troublefree in operation and offer ease of maintenance.

The next article will discuss the prevention of sewage backflow in buildings.

What Would You Do?

Replies to engineering and operating problems of interest to the industrial plant engineer

Conducted by
NATHAN N. WOLPERT
Associate Editor

WHILE many plant engineers have had experience in welding ferrous pipe, questions may arise when the job calls for the welding of nickel alloy tube. Methods to use are described in the discussion of this month's problem.

Should you have a problem that you would like to see discussed in this department or if you have some comments that you would like to add to the discussion scheduled for the next issue, you are invited to write to the Editor.

This Month's Problem

We have the job of welding nickel alloy tube that has light wall thickness. There seems to be some difference of opinion as to how these tubes should be welded. Information is wanted on the method to use and what practices should be followed in making this weld.

Discussion of the Problem

The oxy-acetylene method is recommended for welding nickel alloy tube with light wall thickness. Although this method may be used for welding all pipe and tube of nickel and high nickel alloy, it is especially recommended where the wall thickness is considered too light for metal arc welding or where the diameter is less than 2 in.

Tank or bottled acetylene should be used. Shop generated acetylene should not be used for this purpose unless a scrubbing unit is available to remove sulfur from the gas.

The flame should be adjusted to a slightly reducing condition. The amount of excess acetylene should only be sufficient to compensate for the normal regulator becoming oxidizing in nature. When it is necessary to use an excess acetylene flame longer than 1/16 in. to balance regulator fluctuation, the regulators should not be overhauled.

The joint preparation and design for oxy-acetylene welding is shown in Fig. 1. Precautions to follow in preparing the surface apply to all methods. All foreign material must be removed such as grease, oil, lubricants, paint, marking crayons or, in the case of used material, processing material. Sulfur or lead has an embrittling effect on nickel and the high nickel alloys at temperatures over 600 deg F, and either or both are apt to be present in foreign materials. Heavy layers of oxide should be

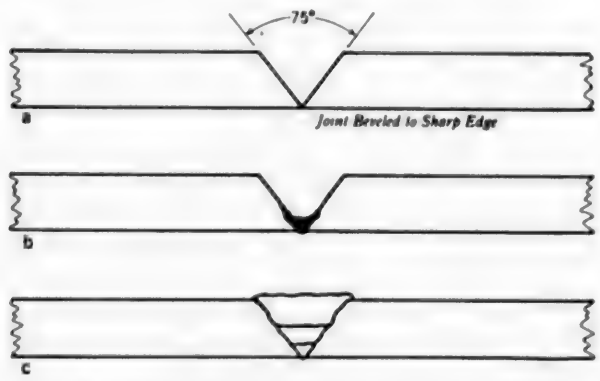


Fig. 1. Welding joint preparation showing layer build-up.

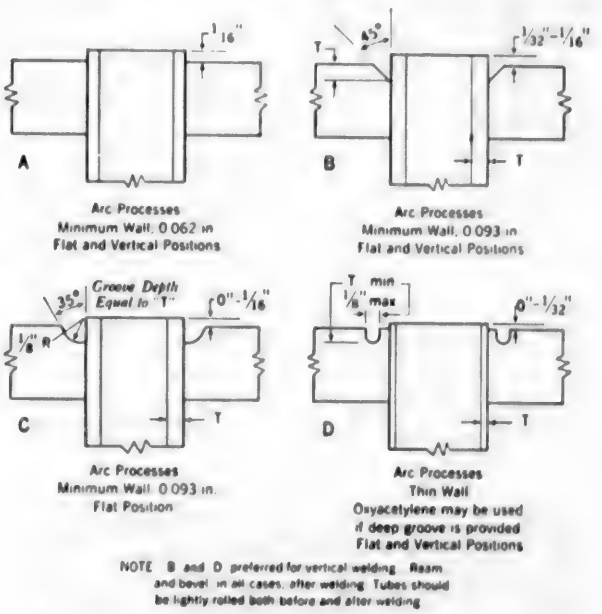


Fig. 2. Suggested joints for welding tubes into tube sheets.

Problem for the Coming Issue

We have a system for chilling water which uses a flooded evaporator. With this type evaporator, what should be the superheat setting of the expansion valve? In figuring the size suction connection to the refrigerant shell around the water tubes, what should be the pickup velocity at low load conditions? Under what conditions, if any, will there be trouble with oil return?

removed as they can cause difficulty in the welding operation.

The type oxy-acetylene gas welding rod to be used is 40 for monel; 44 for K-monel; 41 for nickel and 42 for Inconel. Higher melting point brazing alloys may be used if they do not contain phosphorus. The flux recommended is Inco 3 for monel; Inco 2 for K monel; Inco 2 for Inconel; no flux is necessary for nickel. With K monel, one part lithium fluoride or two parts Inco 2 or 3 flux is suggested.

The proper welding tip size is best determined by experience, although the same or one size larger than that used for steel of similar thickness will usually be satisfactory. Avoid "puddling" the weld. Excessive agitation of the weld puddle can result in porous or cracked welds for monel and Inconel are quite fluid when molten and nickel is relatively sluggish.

Complete penetration is desirable, as any unfused areas can, in some cases, result in early failure through accelerated corrosion or fatigue. The use of two beads or layers is recommended for all diameters and wall thicknesses. The first bead should be made from the top (12 o'clock) to the bottom (6 o'clock) in the case of fixed position vertical welds. If the pipe or tube ends are square and the proper fitup and joint preparation, Fig. 1*a*, has been made, then no filter metal need be added for the first bead. The edges of the joint are flowed together to obtain complete penetration as in Fig. 1*b*. The second or successive beads, as at *c*, should be applied in a normal manner from bottom to top, using the proper filler wire. The two-bead procedure is equally effective when used on joints that can be rotated.

Four suggested joints for welding tubes into tube sheets are shown in Fig. 2.

This information is supplied through the cooperation of International Nickel Company.

The question quoted is quite general and therefore it is difficult to give a specific answer.

For the welding of nickel alloy tubes of light wall, I would recommend the inert gas-tungsten arc (Heliweld) process. Either helium or argon may be used as the shielding gas, although I believe there is a general preference for helium on the nickel alloys. Direct current straight polarity is the preferred source of welding power. With only nickel alloy as a description of the base metal, the best that can be recommended is to have the filler metal match the base metal analysis.

Depending upon thickness, it might be possible to weld these tubes with covered electrodes and arc welding. Gas welding, with a suitable flux, is another possibility in this case.

A. N. Kugler
Chief Welding Engineer
Air Reduction Sales Company

New York, N. Y.

New Drying Heat Source Increases Salt Production

To cut out costly waste, the West Shore Salt Co., Ithaca, N. Y., installed a Dravo Corp. 2,000,000 Btu, oil-fired "Counterflo" warm air, space heater, on a rotary salt dryer. Results were an increase of 100% in the output of its premium grade salt, which commands a 50% higher price than the conventional brand. This adds up to an impressive figure obtained through the simple act of changing the dryer heat source.

Premium crystal salt for pretzels and crackers, produced by this company, comes from brine wells. The moisture is driven off in evaporator pans after which the salt is stored in bins. From here it travels through the rotary kiln dryer on its way to the screening and bagging stations.

View inside rotary dryer looking toward the salt discharge end which connects to the heater.

Previously, the dryer was heated by a direct oil-fired tube extending through the center of the cylindrical dryer. The operation was entirely unsatisfactory as the tumbling salt would adhere to the hot tube and then explode off in chunks with such force that a high percentage was pulverized into small crystals that had to be sold as common grade. Another disadvantage was the fact that an hour's production was lost each morning while three employees entered the dryer and chipped off adhering salt. Considerable maintenance work was also required over the weekends.

A change in the heat supply cured all these headaches. The hook-up is such that hot air from the new heater flows through the dryer in intimate contact with the salt, carrying off the moisture without damaging the crystals. This accounts for the higher percentage of premium grade produced. The new heater removes about 1,500 lb of moisture a day to produce as much premium salt in three days as that formerly produced in seven. Furthermore, weekend overtime has practically stopped.

Air velocity through the dryer is kept low by a bypass in the duct work which shunts part of the heater discharge back into the inlet. In addition to lowering the dryer air velocity, the recirculation and reheating raises the discharge air temperature to 250 deg F for delivery to the dryer. This cuts fuel cost. Both heater and dryer are installed in a prefabricated metal building adjoining the main plant.

PRODUCT APPLICATIONS

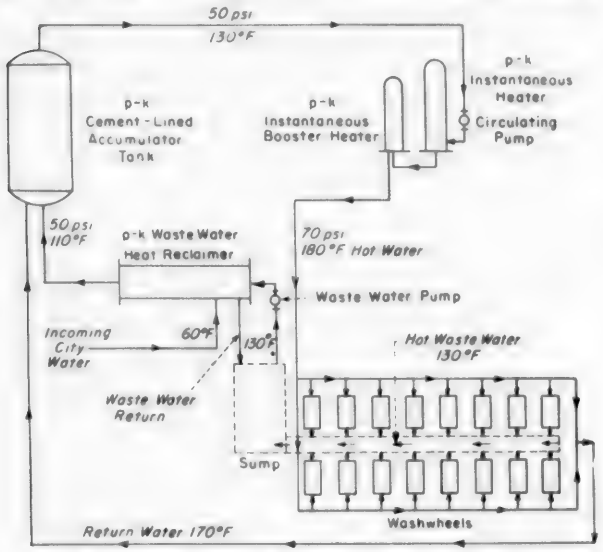
New, Unusual, or Ingenious Uses of Equipment and Materials

Conducted by WM. B. FOXHALL, Associate Editor

Laundry Solves Water Heating Problem

PROBLEM: When demand for hot water increased at Pierce Steam Laundry in Brooklyn, N. Y., it was found that water temperatures sometimes dropped as low as 110 deg F from the standard operating temperature of 180 deg. Sometimes the heating system could supply water to 4 of 16 washwheels at the plant. Rewashes were occasionally necessary because detergents did not suds properly in the warm water. It was often necessary to shut down while the heating system was allowed to build up water temperature, and frequently employees had to work overtime to catch up.

SOLUTION: Plant manager Phil Jacobs and chief engineer John Busch decided to revamp the plant's hot water supply system. Laundry engineers of the Patterson-Kelley Company, East Stroudburg, Pa., manufacturers of hot water



SCHEMATIC LAYOUT FOR PIERCE STEAM LAUNDRY

heaters and heat exchange equipment were called in to recommend a solution. Subsequently a new instantaneous hot water heater was installed together with a booster heater, a cement lined hot water accumulator tank, and a waste heat reclaimer. The installation was made without interrupting the plant operation.

RESULTS: Pierce has speeded up its washing operations by 20% as a result of modernizing its hot water system. It is now supplying 142,000 to 159,000 gallons of rust-free hot water per 8 hour day to the washwheels at a constant 180 deg F temperature. Fluctuating water temperatures no longer ruin certain types of fabrics. Without the need for shutdown or rewash, there are substantial savings in labors, chemicals, detergents, and equipment. There is also a saving of about 10% in the amount of fuel oil used. The accumulator, reclaimer and heat exchangers were placed overhead, leaving ample working space on the floor below.

Boilers Heat Desert Jet Plant

PROBLEM: In a $3 million jet aircraft assembly and operational center, located in an arid basin in the foothills of the 4,000-ft high mountains on the edge of California's Mojave desert, Northrop Aviation, Inc., was faced with the problem of heating over 12 million cubic feet of plant buildings where daytime temperatures may be extremely high while night temperatures sometimes go down as low as 12 deg. F.

SOLUTION: To retain uniform temperatures in the buildings, Northrop selected three of the largest size commercial steel boilers made by the National Radiator Company of Johnstown, Pa. The low pressure steam boilers serve 43 unit heaters and an air conditioning system in the 50-acre installation. The boilers have a net rating of 8,400,000 Btu per hour each.

RESULTS: High capacity unit heaters in the main building are capable of bringing the interior quickly up to temperature during the cold nights. Separate painting and stripping building is also maintained at desired temperatures. Air conditioning using steam from the boilers maintains large office area at comfortable temperatures throughout the year.

Flush Filter Face Facilitates Cleaning

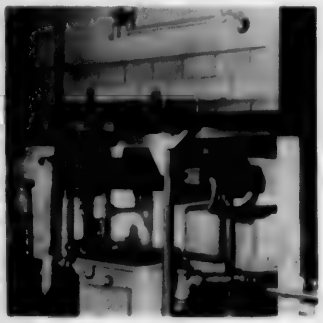
PROBLEM: The tremendous quantities of lint present in clothing manufacture have always created a problem in air conditioning clothing factories. Tiny lint particles released in cutting and sewing operations clog ordinary filters in a day, greatly reducing the efficiency of the units.

SOLUTION: One clothing firm, the L&H Shirt Company of Cochran, Georgia, has licked this tricky problem with units specially equipped to handle lint. Air conditioning dealer Aaron Torch, installed eighteen General Electric packaged units throughout the L&H plant. From each of the units located in heavy lint areas he removed the standard filter and reinstalled it in a sheet metal frame flush on the front of the unit.

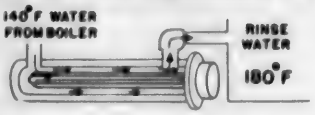
RESULTS: Because lint does not penetrate the filter, but collects as a film on the front, it is possible for the cleanup man to vacuum the face of the filters during his nightly rounds. It is necessary to vacuum clean the manufacturing area floor and work surfaces each night and the filters add only a few minutes to the cleanup man's work.

Electric Booster Heats Rinse Water

PROBLEM: An industrial cafeteria in the midst of remodeling its kitchen facilities found that water from the central system was heated only to 140 deg F, 40 deg short of the 180 deg required by city health codes. Installation of an ordinary type of supplementary heating system would have been costly and there was no space for such a system.



SOLUTION: A compact Chromalox electric circulation heater was selected. This heater, product of Edwin L. Wiegand Co., Pittsburgh, Pa., was installed in the unused space under the washing table. It is a packaged unit with insulation, pipe connections and thermostat included. The main supply of hot water is boosted to the required temperature.



RESULTS: The dishwashing machine now meets health regulations by thoroughly rinsing in 180 deg water. In addition, the heated dishes dry rapidly in air, eliminating hand drying. Labor saving more than balances the heater investment and operating cost.

Direct Fired Heaters Speed Construction

PROBLEM: Construction of the 41-story Prudential Life Insurance Mid-America Office Building in Chicago had to proceed during the winter when high winds off Lake Michigan, ice and snow were a serious impedance to construction activity.

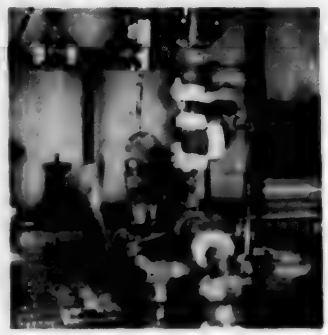
SOLUTION: George A. Fuller Company, general contractors, made a temporary installation of oil-fired forced air heaters on the various floors of the structure. Sixteen standard Dravo Counterflo heaters were fed by portable fuel oil tanks and served by a 220 volt power line. With loose tarpaulins draped over the openings in the superstructure, the heaters were operated around-the-clock seven days a week.

RESULTS: While temperatures ranged as low as 15 deg F below zero and wind velocities were as high as 50 miles an hour, workmen were able to do their jobs in comfort but without being impeded by heavy clothing. Time off for colds and other winter ailments was at a minimum. Construction time on the building was reduced. Heaters kept the inside temperature as much as 40 deg higher than the outside temperatures. Contractors say the building, scheduled for September, 1955, will be ready for partial occupancy this summer.

Fabric Replaces Lead Valve Covers

PROBLEM: At the alkylation unit of California Oil Refining Company valves installed in acid and caustic lines had been covered with lead covering to protect personnel from small leaks which develop at flanges. When repair work was required, lead covers had to be cut or burned off and were awkward to work with or install.

SOLUTION: Valve and flange covers were made of Dynel, a new fabric produced by Union Carbide and Carbon Corp. The fabric is acid and caustic resistant and is of sufficient strength to contain sprays resulting from gasket or packing failures of pressurized lines. At the same time, they permit operating freedom of covered valves. Covers had been tested at the Perth Amboy refinery for several months.



RESULTS: Dynel covers provide protection for the workers against acid or chemical leakage. In both initial cost and upkeep they are far more economical than preformed lead covers. The fabric covers are easy to install and store. Repair work on lines is simpler, since fabric can simply be unwrapped, laundered, and reused.

Diamond Drill Cuts Concrete

PROBLEM: Installation of water mains for the sprinkler system in Rike-Kumler's department store in Dayton, Ohio, presented a number of problems, chief of which was cutting twenty or more holes in 7½ inch reinforced concrete floors to accommodate the 4-and 6 inch mains. All the holes were located in very narrow corridors. Huffman-Wolfe Company of Dayton, who did the work, estimated that cutting the holes by conventional methods would require half a day for each hole and would entail a great deal of objectionable noise and dirt and subsequent patching.

SOLUTION: It was decided to use the Truco Water Swivel and Truco Swivel Diamond Bit. The water swivel is an attachment for portable or stationary electric drills which supplies coolant water to the cutting edge of the diamond bit. Truco swivel and bit are manufactured by Wheel Trueing Tool Co., of Detroit, Mich. The diamond bit was 6¾ inches in diameter by 18 inches long and was mounted on a heavy duty water swivel which in turn was mounted on a ¾ inch drill motor.

RESULTS: Holes were cut in an average of 12 minutes each by one man operating in the confined space. All cores and holes were clean and required no patching.

NEWS OF THE MONTH

HARNESSING HEAT

is first concern of B&W Research Center. Sources and equipment for utilization and control under test.

Finding more efficient equipment to harness heat energy from all sources, whether it be locked in the nucleus of the atom or stored in the more familiar coal pile, is the goal of continuing research at the Alliance, Ohio, Research Center of the Babcock & Wilcox Company, manufacturer of fuel-burning equipment, boilers, process equipment heat-transfer apparatus, tubing, specialty refractories and atomic equipment.

• **NEED.**—The unending and mounting demand for power calls for the utilization of all energy sources. Even with the advent of atomic power, industry must still rely on such older fuels as coal, oil, gas and refinery byproducts if energy is to remain relatively cheap and abundant. And as these fuels are depleted and those of premium quality are exhausted, efficient methods and equipment must be developed to utilize the lower-grade fuels.

At the same time, the chemical, petroleum, metallurgical and other industries are asking for greater economy in heat utilization which requires constantly breaking through barriers to higher and higher processing temperatures. This means that new alloys and refractories must be developed to make these higher temperatures possible.

Such are the challenges confronting B&W researchers. Currently, Babcock & Wilcox is concentrating its activities on research, and has over 350 people at work in its big Research Center at Alliance. The company is seeking to achieve major economies in such diverse industries as utilities, chemicals and petroleum. Outstanding examples of its accomplishments to date have been in the fields of supercritical boilers, fuel burning, alloy development and atomic energy.

• **PROGRESS.**—A specific example is the great decrease in the rate of coal utilization for a given energy output. In 1900 the average central station used six pounds of coal per kilowatt hour while today the average is slightly higher than one pound per kilowatt hour. This is equivalent to the discovery of six times as much coal for power generation.

This above-critical test unit provides a means for investigating conditions that exist in a boiler operating at pressures above the critical pressure barrier.

Aerial view of the B&W Research Center at Alliance, Ohio. The coal piles in the center, foreground, are special coals for testing purposes.

While many new and improved products have been developed specifically for the steam-generating industry, researchers are continually investigating and finding new applications for products in many other industries. As a result, under its intensified research program, B&W is serving a much broader industrial field and the market for B&W products is continually expanding.

A case in point is the company's new refractory development, Kaowool. B&W's interest in refractories led to the investigation and subsequent development of a new process for making Kaowool, which will now make this product competitive with long fiber refractories and superfine glass fibers for use in such diverse fields as household appliances and jet engines. Other examples are the development of high-temperature, high-pressure tubing for manufacture of polyethylene, bubble tray steam washers which also may be used as humidifiers for gas turbines, and special furnace-type reactors for gasifying coal for the production of synthesis gas.

The research at Alliance is, of course, a continuing operation. While many of the results have already effected outstanding commercial improvements, many—equally valuable—have provided a firmer theoretical footing for further research and future improvements. Broadly, investigations which the Center has under way aim at better ways to release, contain, transport, absorb, convert and utilize heat energy from whatever source.

Activities at the Research Center are now headed by Paul R. Grossman, recently appointed director of research when Leslie S. Wilcoxson was promoted from vice president for research to vice president in charge of the company's Boiler Division.

• **STEAM GENERATION.**—Investigations of boiler operations at super-critical pressures led to the development of the company's Universal Pressure Unit, a major contribution to one of the basic trends in the steam-generating field today: the drive toward realization of the larger

The creep and stress rupture laboratory has 136 stations where tests are conducted to investigate the long-time behavior of alloys under conditions of stress and high temperature. This is believed to be the largest laboratory of its kind in the country and is air conditioned summer and winter.

economies which exist in the realm of higher pressures and temperatures.

Babcock & Wilcox is now building a new high-pressure unit for the American Gas & Electric Co. First commerical unit of its kind, it will be located at the Philo, Ohio, plant of the Ohio Power Co. The unit will have a capacity of 675,000 lb of steam per hour. It will operate at 1150 deg F and at the super-critical pressure of 4,500 psi.

The larger part played by the Research Center in the development of efficient methods for firing pulverized coal and in the design of the Cyclone Furnace which has revolutionized the burning of coal during the past 10 years, reflects a second important trend underlying much of the work at Alliance and in the field as a whole. Because more and more power plants are being forced to burn low-grade solid fuels, the need for increasing the efficiency of their utilization becomes ever more acute.

Studies made on coals from all over the world, and on such fuels as petroleum coke, which may soon remove residual oil from the market, have resulted in laboratory methods by means of which important commercial-scale burning characteristics of any solid fuel can be predicted. Research on the combusition of all types of fuel (coal, oil, gas, waste materials, nuclear energy) is a major part of B&W's research activities. One of its outstanding results is a newly developed oil-burning Cyclone Furnace.

Still another achievement is the development of a high-pressure water tube boiler for use in a coal-burning locomotive. The boiler operates at 600 psi and 900 deg F, giving it high thermal efficiency. The first such Baldwin-Westinghouse locomotive, which combines the B&W high-pressure boiler with a Westinghouse steam turbine and electric drive, is rated at 4,500 hp.

It operates at double the efficiency of the average coal-burning reciprocating steam locomotive, and can compete favorably with diesel-electric locomotives in industrial areas where cheap coal is abundant. After trials at Alliance, the boiler is being further tested by the Norfolk & Western Railroad. N&W is currently putting the new locomotive through actual road tests.

• **METALS.**—In the field of metallurgical research, studies of super-strength alloys to withstand temperatures as high at 1250 deg F in steam boilers have produced five very promising compositions possessing long-time rupture strengths two to three times greater than that of the 18 Cr-8 Ni type alloys, which are now the strongest superheater materials available.

• **ATOMIC ENERGY.**—Because of its success in developing materials of construction, containing corrosive materials, fabricating and welding, and preventing radioactive leakage, the company, already possessed of know-how in the atomic field, has been chosen by Consolidated Edison to design, fabricate and erect the entire nuclear and steam-generating part of the first privately financed atomic power plant.

Furthermore, Babcock & Wilcox will be the first company to build a major private plant for the production of fuel elements and other reactor core parts for commercial nuclear power reactors. A B&W plant now under construction at Lynchburg, Va., will soon be producing fuel elements and reactor components.

A significant recent advancement in the field of atomic energy made by the Research Center is the development of a newly designed gasketed closure which prevents radioactive leakage from atomic reactors. An improvement over the solid weld—also developed by Babcock & Wilcox and used on the atomic submarine Nautilus—it eliminates the machine-tool cutting and rewelding previously required to open and close atomic reactors.

• **KAOWOOL IN BLANKETS.**—New uses are emerging for Kaowool, the high-temperature refractory fiber, that promise to expand the market and make this versatile product competitive with other long-fiber refractories and superfine glass fibers. Among the expected new uses for the improved product are in incinerators, turbine blankets, fire-resistant construction, household appliances and guided missiles.

Pilot plant for the production of B&W Kaowool insulating refractory blankets resulted from a new method of manufacturing developed at the Center.

Currently Kaowool is being used as an insulating blanket in the afterburners and tailpipes of jet engines, where it successfully withstands temperatures up to 2,000 deg F indefinitely. The material is also being tried out as insulation in trucks and cars, filling for life preservers, reinforcement for plastics and as a resilient packing for kilns, hot-air ducting and annealing ovens.

B&W is now producing Kaowool at its Research Center in the form of a tough resilient blanket. No organic binder is used to hold this blanket together. Hence, the blanket retains its full strength and coherence at much higher temperatures than other high-temperature refractory blankets. In this form, Kaowool can be successfully hung inside an inclosure without settling and without needing to be sandwiched between retaining walls.

Kaowool is a pure white homogeneous fiber made by melting and blowing kaolin, the clay from which it takes its name. The material does not melt below 3,200 deg, and as a fiber, can withstand temperatures up to 2,000 deg without change or loss of resiliency. It thus surpasses standard glass wools, which begin to deteriorate at 1,000 deg, and rock wool, which is only effective up to about 1,200 deg. To make the fiber, kaolin clay is first electrically melted. The molten material then streams through a tapping nozzle and is blown into fibers. The processed Kaowool is then collected on a pad-forming conveyor.

• **LARGE-SCALE PILOT.**—The Research Center conducts tests over the full gamut from laboratory through pilot plant to full scale. Often researchers must develop their own specific methods and apparatus to obtain the data they need for the successful handling of a problem. Many of the facilities and much of the equipment at Alliance are unique.

For example: A special closed-loop pilot unit for below-critical steam studies aimed at finding optimum arrangements of tubes in a boiler; the largest creep laboratory in the world with 136 stations for determining creep and rupture strength of materials after long periods at high temperatures; models which led to the improved furnace design for the Universal Pressure Boiler, including a 1/6-scale gas-fired model used to determine the best furnace arrangement for thorough mixing of recirculated gas with products of combustion; a high-temperature viscometer which measures the viscosity of coal ash at temperatures up to 2,800 deg.

GAS AIR CONDITIONING

for homes will use motor compressor. Early production expected after tests.

If this summer's program of field testing goes as well as expected, the Coleman Company, Inc., Wichita, Kan., expects next year to market limited production of a practical, economical gas-powered summer air conditioner for homes. This unit would be driven by a gas motor. Sharply increased production is scheduled for 1957 as Coleman puts gas-powered air conditioning on the mass market on a gradually expanding basis.

• **SYSTEMS.**—The company also expects that another—and totally different—system of residential gas air conditioning will be in the field test stage next year. This might be binary-type refrigerant jet, adsorption, or open absorption—three other gas cooling cycles on which Coleman is doing intensive research work.

Soundproof, outdoor cabinet encloses gas motor and compressor as well as water and air cooled condenser and reservoirs for oil and refrigerant.

Announcement of the company's research project was made by Sheldon Coleman, president and general manager, at a convention of the Southern Gas Association in New Orleans May 16. Immediately after speaking on "Progress in Gas Air Conditioning," Mr. Coleman released detailed information on the current gas motor-driven test model.

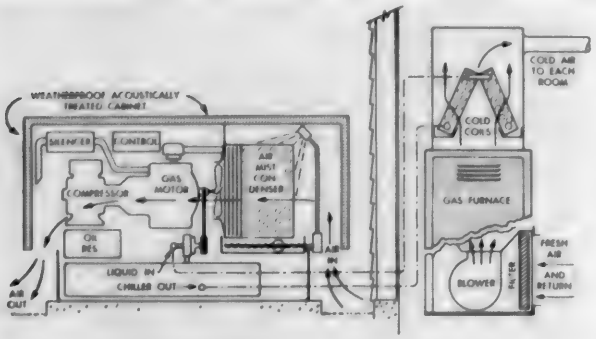
• **LOAD FACTOR.**—Mr. Coleman explained that the research program stems from the present situation in which increasing sales of electric air-conditioning equipment are building a summer peak load on the electric utilities and in which the heavy trend to gas heating has already built a winter peak load on the gas utilities. The electric industry needs a balancing winter load and, for that reason, is working to develop a satisfactory electric heat pump and electrical resistance heating, he said. On the other hand the gas industry needs a summer load, which the Coleman research into gas air conditioning is intended to supply.

• **TEST MODEL.**—The present test model gas-motor air conditioner—which is seen as the immediate forerunner of next year's production model—is a remote unit, for installation outside the house. A cooling coil would be installed inside, either in the furnace plenum or as a separate unit. With a plenum coil, the equipment would require no floor area aside from that already used by the furnace.

Another feature of the equipment is that it incorporates a sealed-in refrigerant circuit and a liquid chiller of greatly advanced design. The usual plumbing skills would be sufficient to run the chilled liquid lines between the remote unit and the cooling coil.

Mr. Coleman gave this description of the equipment:

Inside a neatly styled, weatherproof acoustic housing —which is no larger that the cooling tower required for an ordinary system— is everything necessary to convert the heat energy of gas into a chilled liquid.



Schematic diagram of gas-motor system.

It contains its own motive power and water-saving equipment, eliminating the need for the forced-air cooling tower with its pump, spray system, plumbing, and wiring.

Equipment includes the following items: Air-cooled gas motor, refrigeration compressor directly connected to the motor, evaporative condensing unit with pump and hydraulic slingers, liquid chiller, liquid circulating pump, 110-volt starter, muffler, oil reservoir, and controls.

Current designs include 3- and 5-ton units—the most popular sizes in the residential market.

• **DISTRIBUTION.**—Air-handling equipment would be the same as in the present Coleman air conditioning electric systems. Supply ducts would be either Coleman's present 3½-inch-diameter Blend-Air tubes, or conventional ducts. Coleman "blender" outlets or standard registers would be used.

• **FEATURES.**—Mr. Coleman gave these other highlights of the gas-motor system:

(1) The evaporative condenser would operate on the wet-bulb temperature of the air—which rarely, if ever, rises above 80 deg F, regardless of dry-bulb air temperature. This unit is frequently 50 to 60% more efficient than an air-cooled condenser of the dry-bulb type.

(2) The direct drive starter would run on 115-volt a.c. It would simply be plugged into an ordinary household convenience outlet.

(3) Initial installed cost probably would be slightly higher than the cost of an electrical system of comparable capacity. However, when operating costs are considered, Mr. Coleman said, the advantage in most areas is "spectacular." With natural gas at 70 cents a thousand cubic feet, the gas motor system would have an operating cost (including gas, electricity, and water) of only half the cost of a typical electric system using 2-cent-per-Kwh current.

(4) Noise is no problem. The unit's enclosure is acoustically treated. The noise level compares favorably with present electric air-conditioning equipment.

(5) No special equipment or skills are required to service the power unit.

(6) The compressor is coupled directly to the drive shaft. No belts or pulleys are used.

(7) The goal in motor life—which is believed to have been reached—is a unit that will run for 10,000 hours without major overhauling. This is equal to five full cooling seasons in Houston or New Orleans—and considerably more than five seasons in regions farther north.

(8) In regard to servicing, the Coleman Company expects to eliminate all necessity for service during a cooling season up to 2,000 hours long. Spark plug life has already been extended to 2,500 hours or more, and distributor point life is up to approximately 2,200 hours. The units incorporates a large reservoir for lubricating oil; fill the tank once, and it will not require any more oil for an entire season.

• **COOPERATING.**—Work on the gas motor system is being done by an inter-company team. In addition to Coleman, the team consists of D. W. Onan & Sons, power plant manufacturers; Minneapolis-Honeywell, control manufacturers, and the Copeland Refrigeration Corp., manufacturers of the compressor used.

Work on the other three promising cycles is being done by independent research organizations under Coleman's direction. Arthur D. Little, Inc. is working on the binary-type refrigerant jet system; Texas College of Arts & Industries is working on adsorption, and the Institute of Gas Technology is working on open-type absorption.

Mr. Coleman gave this account of progress in these three phases of the program:

• **BINARY JET SYSTEM.**—Substantial progress has been made in increasing the efficiency of the binary jet system, Mr. Coleman said, "and we have hopes that further research over the next year or two may enable us to reach our goal. This system which uses one fluid (mercury) to drive the system and another fluid as refrigerant, may prove practical in sizes ranging from 7½ tons all the way down to ½-ton capacity. This could mean a practical line of gas-fired room coolers. Inherent advantages of this system are low initial cost and compactness."

• **ADSORPTION.**—This system would have an advantage in that no refrigerant or pressure-containing parts would be required, the company president explained. Also, it would be one of the few systems that allows humidity control independent of temperature control. Thus it would adapt itself with equal ease and maximum efficiency to the humid Gulf Coast areas or the dry Arizona region, or any condition in between. Adsorption equipment is now in the research model stage and has produced useful cooling. However, a great deal more work is needed.

• **OPEN ABSORPTION.**—This would be different from the conventional absorption system. Considerable progress has been made, even though the research organization was commissioned by the company only a few months ago, Mr. Coleman said. This system, he explained, would be low in first cost, would have independent humidity control and would not require a pressure-type refrigerant.

REACTOR DESIGN

completed for California research institute permits concurrent industrial projects.

Stanford Research Institute has completed a preliminary design and cost study for a highly versatile test nuclear reactor it hopes to establish in California. Con-

(*Continued on page* 142)

BOOK REVIEWS

Publications abstracted in this department should be ordered direct from publisher.

CONDUCTION HEAT TRANSFER

Four methods of presenting the subject matter are found in the text book Conduction Heat Transfer, by P. J. Schneider, research associate, Department of Mechanical Engineering, University of Minnesota. These are: analytical which involves the derivation of a mathematical solution; graphical techniques which are based on the properties of characteristic field equations and numerical principles; numerical method which is an approproximate computational technique, and the experimental method which is reserved for problems which cannot be handled conveniently by the analytical, graphical and numerical methods.

The text makes it possible for the student to become acquainted with all four methods. The book is designed to be used during the first of a three-semester sequence of graduate level courses on conduction, convection and radiation, and for use as a supplementary text in the usual undergraduate course covering in one semester, the three modes of heat transfer.

A large number of numerical examples are presented within the text material, and there are a large number of problems at the end of each chapter.

Some of the chapters are: Steady one dimensional systems; differential equations of Bessel and Legendre; extended surface; Fourier series and integration of partial differential equations; steady two dimensional systems; steady state numerical method; steady heat source systems; steady porous systems; transient systems; transient numerical method, and experimental analogic method.

Conduction Heat Transfer, by P. J. Schneider. Cloth bound, 6 x 9 inches, 395 pages. Published by Addison-Wesley Publishing Co., Inc., Cambridge 42, Mass. Price, $12.50.

THE GUIDE

Several chapters have been rewritten and others revised for the 33rd edition of the Heating Ventilating Air Conditioning Guide. There are 53 chapters grouped in the following sections; Fundamentals, human reactions, heating and cooling loads, combustion and consumption of fuels, systems and equipment, special systems, and instruments and codes.

Included in a pocket is the ASHAE psychrometric chart, 24 x 32 inches.

Heating Ventilating Air Conditioning Guide 1955. Cloth bound, 6 x 9 in., 1160 pages plus a catalog data section. Published by the American Society of Heating and Air-conditioning Engineers, 63 Worth St., New York 13, *N. Y. Price,* $12.

GROWTH OF THE ATOMIC INDUSTRY

Results of a survey conducted by the Atomic Industrial Forum, Inc., are presented in A Growth Survey of the Atomic Industry, 1955-1965. It is believed that the present growth rate of atomic energy research will continue to increase in size and productivity until they double their current rates by 1958 and double again by 1965. The minimum growth rate will require 10,000 more personnel by 1965 and the maximum, 20,000. During the next seven or ten years, the largest equipment markets will be dominated by military requirements for submarines and aircraft.

A Growth Survey of the Atomic Industry, 1955-1965. *Paper-bound,* 8½ x 11 *inches, 64 pages. Published by Atomic Industrial Forum, Inc., 260 Madison Ave., New York* 16, *N. Y. Price,* $7.50.

ASRE DATA BOOK

The fifth edition of Refrigeration Data Book, a volume issued by the American Society of Refrigerating Engineers, contains 61 chapters of basic information written by 89 experts in their respective fields.

Most of the chapters have been rewritten as compared with the previous edition, and in addition, there are new chapters on precooling, fishing boats, and passenger automobiles.

It includes design information, formulas, tables, diagrams and sample engineering calculations in factual handbook style presentation. It should prove useful to application engineers, architects, consulting engineers, contractors and sales engineers.

The book contains a Classified Section in which are listed manufacturers of components and assembled units of air conditioning and refrigerating equipment.

Refrigerating Data Book, 5th Edition, edited by Harold M. Hendrickson. Leather bound, 6½ x 9 *inches,* 984 *pages. Published by the American Society of Refrigerating Engineers,* 234 *5th Ave., New York* 1, *N. Y.*

NFPA HANDBOOK OF FIRE PROTECTION

There is one book that requires no selling to the engineer engaged in fire protection work. It is the Handbook of Fire Protection with E. U. Crosby, H. A. Fiske and H. W. Forster as authors of the early editions. This book was first published in 1896 and since 1935 the authors donated all their rights to the book, to the National Fire Protection Association. This edition, the eleventh, was prepared under the editorship of Robert S. Moulton, technical secretary, NFPA.

The entire text, which was last revised in 1948, has been brought up to date by the NFPA staff and the more than 100 expert consultants. The new edition has revised tables of fire hazard properties of chemicals, solvents and other hazardous materials. Automatic spray sprinklers are described for the first time. Included is a discussion of methods of measuring flows from spray nozzles, new tables on hydraulics, and the testing of automobile pumpers. The handbook has 73 chapters covering the wide field of fire protection—from air conditioning and blowers to wood frame construction.

NFPA Handbook of Fire Protection, edited by R. S. Moulton. Fabrikoid covers, 5 x 7½ inches, 1656 pages. Published by the National Fire Protection Association, 60 Batterymarch St., Boston 10, Mass. Price, $10.50.

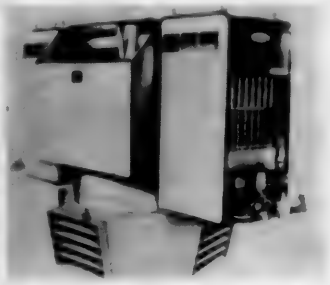
(*Continued on page* 136)

NEWS OF EQUIPMENT AND MATERIALS

Use the convenient prepaid postcard on page 130 for securing additional information on items described in this department.

Gas-Fired Unit Heaters

A line of gas-fired unit heaters is introduced by L. J. Wing Mfg. Co., Linden, N. J. Suspended from the ceiling with a downward discharge, the heaters are self-contained units that have gas burners, a combustion chamber, a heat exchanger, a motor-driven fan, and fixed or revolving discharge outlets.



The combustion chamber and heat exchanger are constructed of 16-gage aluminized steel, which is welded into a one-piece assembly. The burners are made of heavy wall cast iron with drilled ports. A built-in draft diverter provides proper burner operation under abnormal conditions of back draft. Automatic safety controls are provided with the heaters, which have an input capacity of 430,000 Btu per hr.

The heaters are equipped with discharge outlets to suit the installation requirements of ceiling height and floor area. The revolving discharge outlets send the heat downward in a moving airstream. The same circular motion of air provides cooling in the summer. Fixed discharges are available for such locations as loading docks and storage spaces.

More information? Circle Item 1 on postcard, page 130.

Cabinet-Type Air Conditioners

Cabinet-type air conditioning units, with capacities from 600 to 48,000 cfm, for industrial and commercial applications are available from American Blower Corp., Detroit, Mich.

Three basic types of units are made: air conditioning units (illustrated), sprayed-coil conditioner units, and multi-zone conditioner units. The air conditioning and sprayed-coil conditioning units are available in either horizontal or vertical arrangements, both with a horizontal air flow through the cooling coils. The multi-zone conditioner units are made in one arrangement for either horizontal or vertical air flow.

Cooling and dehumidifying can be done with chilled water, direct-expanded refrigerant, or brines; heating by steam or hot water; air filtering by cleanable or throw-away filters; and humidification by either target-type water nozzles or sprayed coils.

Manual or automatic controls can be provided with the units for temperature, multi-zone, or ventilation control.

More information? Circle Item 2 on postcard, page 130.

Lining Restores Water Tanks

Large water storage heaters and steel tanks that are rusting away on the inside can be restored to operating condition by lining them with a cement preparation made by Pocono Fabricators, Inc., division of The Patterson-Kelley Co., Inc., East Stroudsburg, Pa.

Called C-17 Pre-Krete, the lining is a prepared and blended cement formula that will not shrink or crack and is not subject to high temperature failures.

In applying the lining, the interior of a storage tank is first dried and usually cleaned with a wire brush. However, the lining can be applied directly over rusted areas. It is then mixed with water, about two gallons to a 95-lb bag, to the consistency of paste and applied with a trowel to a thickness of ½ in.

After the lining has set, a small amount of water is placed in the tank and the manhole closed. In such a moisture-laden atmosphere, it will cure in 24 hr. For open-type vessels, the lining is hosed periodically with water to aid curing.

More information? Circle Item 3 on postcard, page 130.

Line of Slip Roll Formers

Power and hand-operated, slip roll forming machines with pinch-type rolls are available from Niagara Machine & Tool Works, Buffalo, N. Y.

Two of the rolls feed the material. The third, in the rear, deflects the sheet to produce the curvature. The upper feed roll, around which the sheet is formed swings open at one end, clear of its bearing, to permit completed cylinders to be removed quickly.

Working with lengths up to 120 in. and thicknesses up to ¼-in. mild steel, the slip roll formers are used in diverse applications to form light and heavy pipe; stacks, drum, pail, tub, and other container bodies; large tank segments; multiple beads; and numerous kinds of cylindrical, oval, and rectangular products.

Built in heavy, medium, and light capacities with 6, 4, 3, 2, 1½, and 1-in. rolls to handle general requirements, standard units can be outfitted with special attachments for particular classes of work, quantity production, and other purposes.

Descriptive literature covering the complete line of slip roll formers can be obtained by requesting Bulletin 77D.

More information? Circle Item 4 on postcard, page 130.

Device Keeps Ladders Level

A safety device for preventing accidents associated with the use of ladders is being put on the market by H-B Industries, Inc., Oakland, Calif.

Patented under the name of Ladr-Levl, the device can be attached to wooden or metal ladders. Its self-adjusting legs adapt themselves to uneven terrain and permit the ladder to stand upright securely. Slipping is prevented by non-skid, swiveling feet. For use on stairways or steps, its legs take a 9½-in. riser.

When the user puts his weight on the first rung, the mechanism locks automatically in place, and can be unlocked only by hand. The weight of the ladder is directed downward along the side rails, eliminating lateral stresses.

The device can be installed by the purchaser and can be transferred from ladder to ladder.

It is manufactured to a minimum 1000-lb ladder load test and is fabricated of aluminum alloy. It weighs 5 lb.

More information? Circle Item 5 on postcard, page 130.

Filters for Ammonia Systems

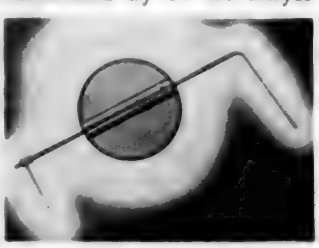
Replaceable, core-type filter-driers are manufactured for ammonia systems by Sporlan Valve Co., St. Louis, Mo.

With ½, ¾, and 1-in. FPT connections, the filters, known as Catch-Alls, have porous cores capable of filtering out small particles of scale and foreign matter. They are made in sizes from a 1-core, 48-cu. in. model to a 4-core, 192-cu in. model. The cubic inches represent the effective volume of the desiccant, or drying material.

More information? Circle Item 6 on postcard, page 130.

Graduated Pitot Tubes

Stainless steel pitot tubes with inch marks inscribed on both sides for finding the center of a duct or making an accurate traverse are introduced by F. W. Dwyer Mfg. Co., Michigan City, Ind.



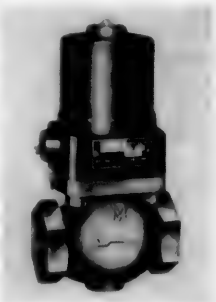
Available in a variety of lengths from 12 to 60 in. and intended for all types of air velocity or static pressure measurement, the tubes are furnished with a direct-reading chart for determining air velocities and direct-reading curves for elevated temperatures. In addition to the plain tube for hand positioning, an integral mounting gland for ½ or ¾-in. pipe thread and a split flange for duct mounting are also available at additional cost.

The tubes are suitable for temperatures up to 800 deg F, and conform to the specifications of the NAFM and the ASHAE.

More information? Circle Item 7 on postcard, page 130.

Valve Uses Line Pressure

A packless solenoid valve that utilizes line pressure to assist the solenoid in opening and closing the valve is introduced by Magnatrol Valve Corp., Hawthorne, N. J.



An auxiliary operating piston, which is integral with the disc holder, assists the solenoid in opening the valve against higher line pressures. At low or no pressure the solenoid alone will actuate the valve.

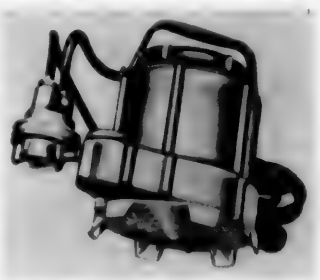
The valve, called the Type S, is designed for normally closed operation and provides a full port equal to the nominal pipe size opening. It can be applied to control automatically, or from remote points, the flow of steam, hot liquids, and gasses, not injurious to bronze, at fluid temperatures up to 400 deg F.

The valve body is globe pattern, screwed ends, and is available in sizes from ½ to 3 in., cast from high pressure bronze. It can be supplied with a hand lift or hand lever for manual control, or with a metering stem for throttling the flow. An additional feature of the valve is that the solenoid and operating mechanism can be removed and serviced without breaking the electrical leads.

More information? Circle Item 8 on postcard, page 130.

Commercial Submersible Pump

A submersible pump for commercial use has been developed by Kenco, Inc., Lorain, Ohio, that has a capacity of 5000 gph at low heads, 55 gpm at 20 ft, and 25 gpm at 28 ft.



Called the Kenco OID, the pump is suitable for sumps, septic tanks, flooded basements, boiler room pits, transformer vaults, excavations for buildings and other installations in large buildings. It weighs 50 lb and is 13 inches in diameter by 11⅛ inches high. It is small enough to be carried in one hand.

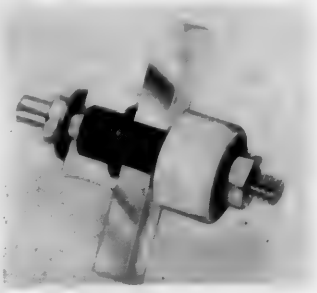
The pump is equipped with a 1½-in. vertical discharge port which permits straight connections without elbows or extra fittings. Power is supplied to it through a 10-ft cable by a ½-hp, 1725-rpm motor.

Set at the factory to turn on when water is approximately 10 in. above its base, the pump shuts off automatically when water is removed to within ⅝ in. of its base. It is available in 115 and 230v a-c and in three models for installations requiring continuous or manual operation; applications requiring automatic operation only; and installations requiring manual starting and automatic stopping.

More information? Circle Item 9 on postcard, page 130.

Hermetic Electric Terminal

An hermetic terminal, No. 4780-25 (modified), for electrical applications where an hermetic seal is essential, such as in motor-compressor units, is being produced by Lundey Associates, Waltham, Mass. The design of the terminal is sufficiently flexible to allow various modifications, and is adaptable for sealed units in air conditioning, refrigeration and chemical processing equipment, pumping equipment, petroleum handling equipment, and laboratory and testing units, including high-current rectifiers, controls and relays.



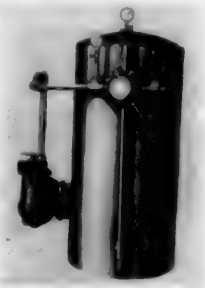
The terminal is a ceramic, compression-type, anchored-gasket terminal with Neoprene or silicone rubber as the sealing member. It has a current capacity up to 100 amp. and a voltage rating of 5000 v. Its outside diameter is ⅞ in., and its overall length is 2½ in.

It is available with a single copper or brass conductor. (The unit illustrated is an adaptation of the terminal for motor-compressor units of heavy wall construction that are used in air conditioning units.)

More information? Circle Item 10 on postcard, page 130.

Packaged Filter System

A packaged filter unit for use with private swimming pools is offered by Graver Water Conditioning Co., New York, N. Y.



Besides the steel tank, the component parts of the filter unit include a recirculating pump, hair catcher, multiport control valve, sight glass, pressure gage, and graded Anthrafilt filter material. The single unit filter is suitable for use with average size private pools. For larger pools, one or two additional filters can be connected with prefabricated piping to the basic control unit.

The removal of accumulated dirt from the filter takes about fifteen minutes a week.

More information? Circle Item 11 on postcard, page 130.

Exchangers Are Carried in Stock

An expanded line of standard U-type heat exchangers is announced by Bell & Gossett Co., Morton Grove, Ill.

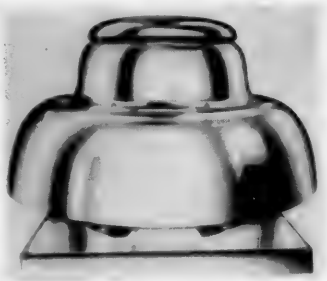
One of the series of heat exchangers, the SU, is designed for heating a liquid with condensing steam. It is constructed for 150 psi working pressure and can be constructed according to the ASME code at no extra charge. Practically all its sizes are carried in stock for immediate shipment. The chief use of the series is for heating water with steam in capacities from 16 to 1200 gpm. It can also heat other liquids such as oil and antifreeze solutions.

The other heat exchanger series, the WU, consists of standard shell and tube units that use boiler water for heating; the company's booster is used for circulating the boiler water. In addition to its heating applications, this series heater is also a condensate cooler. Constructed for 150 psi working pressure, it is also available in ASME code material and construction at no extra charge. These heaters are also carried in stock for immediate shipment.

More information? Circle Item 12 on postcard, page 130.

Belt-Driven Exhausters

Aluminum belt-drive roof exhausters are being manufactured by Jenn-Air Products Co., Inc., Indianapolis, Ind. The addition of the line of belt-drive equipment increases the range of exhauster capacities made by the company from 3800 to 12,500 cfm.



Like the company's direct-drive roof exhausters, the belt-drive models have a low contour, the same architectural design, and are constructed of corrosion-resistant aluminum. The purpose of the exhausters' low contour is to adapt them to the overall appearance of contemporary industrial and commercial architecture.

More information? Circle Item 13 on postcard, page 130.

1½-Hp Room Air Conditioner

A 1½-hp, 230-v unit is added to the 1955 custom line of room air conditioners by Major Appliance Div., General Electric Co., Louisville, Ky. To be known as the Model R102M, the unit is the most powerful room air conditioner manufactured by the company. It is designed to cool areas up to 1000 sq ft, under average residential conditions, and has a dehumidification capacity of 4 pints per hr.

Like other models in the line, the unit can be installed flush with the inside wall. This makes it possible to close curtains and drapes when the unit is not in operation. If an interior-projected position is preferred, the flat top of the unit can be employed as a shelf for vases or other decorative items. The controls are concealed by a panel at the base of the cabinet front.

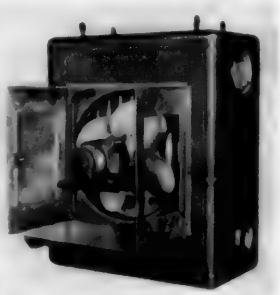
The model is available in a choice of two cabinet finishes: a blonde finish for modern room settings; and a mahogany wood grain finish for more traditional rooms.

Three rotator air directors located behind the front grille can be individually adjusted, so that a number of air flow patterns is available. An aluminum filter reduces the amount of dirt, dust, and air-borne pollen in the room.

More information? Circle Item 14 on postcard, page 130.

Unit Heater Has Duct Frame

An oil-fired unit heater, Model UHE, with a galvanized duct frame is an addition to the line of unit heaters manufactured by Delta Heating Corp., Trenton, N. J. The frame is an enclosure around the propeller fan and motor assembly for attachment to a duct.



Service doors are provided at both sides of the enclosure. The controls are located at the side of the heater and above the oil burner. Standard adjustable unit heater louvers are attached to the front of the heater, or the unit can be purchased with a flanged front if continuing duct work is to be used.

The heaters are available in six sizes with outputs from 112,000 to 280,000 Btu per hr.

More information? Circle Item 15 on postcard, page 130.

Floor Drain Is Changed

Perimeter slots have been added around the grate of the Super-Flo floor drain manufactured by Josam Mfg. Co., Michigan City, Ind. The additional slots increase the free drainage area of the top of the drain in order to permit a greater flow rate into the drain body.

Waste water enters the drain body at the edge of the drain top instead of flowing over a wide section surrounding the slots or holes. Since the waste water does enter the perimeter slots first, the friction loss is reduced and the flow rate into the drain is increased.

The floor drains are available with cast iron or brass grates.

More information? Circle Item 16 on postcard, page 130.

Masonry Drill Is Improved

Carbide-tipped masonry drills named Core-Vent have been improved by Super Tool Co., Detroit, Mich.

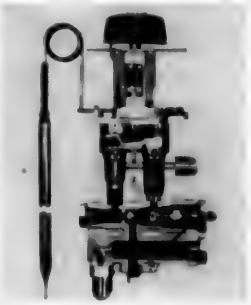
The milled slots for ejecting chips have been widened to eliminate packing and binding with less heat generated. Two of the inserted carbide teeth undercut a clearance so that the core can be removed as one solid piece. The versatility of the drill has been increased by removable shanks in sizes from 5/8 to 6-in. diameters to permit extension drilling of deep holes and access to places difficult to reach.

To provide an attractive appearance, the drills are now plated with a gold tone which provides anti-corrosion properties. Drill sizes are available from 1/4 to 6-in. hole sizes.

More information? Circle Item 17 on postcard, page 130.

Thermostatic Selector Valve

An automatic thermostatic selector valve for use on year-round air conditioning systems utilizing either hot or cold water as a heat exchange medium is announced by Detroit Controls Corp., Detroit, Mich.



Change-over from summer to winter and winter to summer operation is accomplished thermostatically by the valve from the temperature of the incoming water. The valve, which is called Selectaflow, requires no pneumatic lines or electrical connections because its operation is mechanical and automatic.

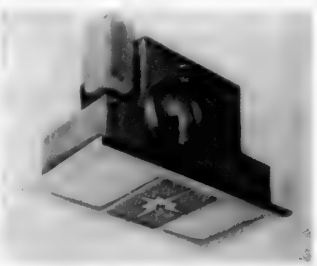
A temperature adjustment knob located on the valve allows building occupants to select the temperature most comfortable to them. Once set, it provides the same temperature in winter and summer and does not have to be reset unless a higher or lower temperature is desired.

Available in two capacities, the proper size valve can be determined by correlating the pressure drop with the rate of water flow.

More information? Circle Item 18 on postcard, page 130.

Ceiling Light Ventilates

A ceiling light and ventilator combination unit for use in either inside or outside bathrooms is announced by Trade-Wind Motorfans, Inc., Rivera, Calif.



The unit has two 75-watt lamps located on either side of a single wheel blower unit which exhausts 100 cfm. The blower ventilates steam, lingering dampness, and odors.

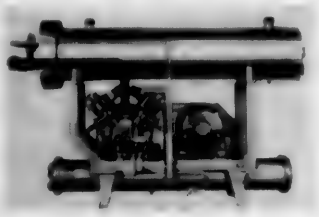
Mounted flush in the ceiling, the unit's translucent ribbed glass conceals the two light housings, and expanded metal with a decorative design in bright chrome conceals the blower unit. The grille is held in place by a single thumb screw, which facilitates cleaning and lamp replacement.

Measuring 13 7/8 in. wide x 7 3/16 in. deep x 8 in. high overall, the unit can be installed between joist spaces in the ceiling and is prewired to an external junction box. It can be wired to a single switch, or 3 wires can be run to a double switch. The company's time-delay switch also can be used with the unit.

More information? Circle Item 19 on postcard, page 130.

Packaged Liquid Chillers

Packaged liquid chillers for air conditioning and process cooling have been developed by Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.



The units range in size from 7½ to 100 tons. They consist of a multiple cylinder compressor, a water-cooled shell-and-tube condensor, a liquid chiller, the necessary controls, electrical wiring, refrigerant piping, and expansion valves. Their installation requires setting and connecting water and electrical lines.

The chillers are made for installation in clinics, motels, and multiple-unit offices and buildings. Consoles are also provided by the company in a range of sizes for hot and cold water year-round air conditioning.

More information? Circle Item 20 on postcard, page 130.

Small Motor for Oil Burners

A smaller and lighter 1/12-hp oil burner motor, which has the same starting torque of standard ⅛-hp oil burner motors, has been developed by General Electric Co., Schenectady, N. Y.

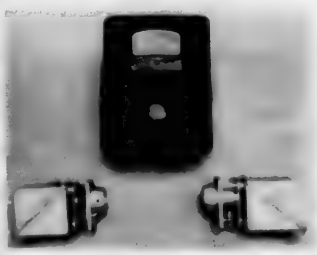
The motor is ½-in. shorter and weighs over a pound less than the company's ⅛-hp oil burner motors.

The 6⅜-in. NEMA-N mounting flange is standard, and the smaller, NEMA-M 5½-in. diameter rabbet is available as an optional mounting.

More information? Circle Item 21 on postcard, page 130.

Smoke Density Indicator

A smoke density indicator system, the Fireye FE-3, for keeping smoke discharge within limits of smoke control and air pollution ordinances is available from Electronics Corporation of America, Boston, Mass.



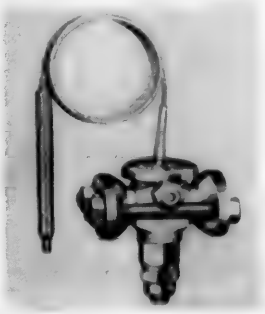
The system consists of a light source, a photoelectric scanner, and a smoke density indicator. The light source and scanner are installed on the stack or breeching so that the light beam is aimed directly at the lens of the scanner. The density of smoke obscuring the light beam is measured and indicated directly on the smoke density indicator in terms of both smoke density and Ringelmann number. An alarm relay provides for the operation of an external alarm at a preset value of smoke density.

One of three of the company's Series 55 recorders can be used with the indicator system to make continuous recordings of smoke conditions over a 24-hr period. The 55AK1 smoke time recorder is a single pen unit that records periods of excess smoke on a 12-in. chart. It shows both time and duration of excess smoke over a preset value. The Type 55AL1 smoke time recorder provides 8-in. chart records of time and duration of excess smoke from two or more smoke density indicators. The Type 55AM1 smoke density recorder provides a continuous record of smoke density directly on a 12-in. chart. It is calibrated to record the Ringelmann number of the smoke condition.

More information? Circle Item 22 on postcard, page 130.

Thermostatic Expansion Valves

A series of thermostatic expansion valves, with flange-type, tongue-and-groove connectors, for use on industrial and commercial refrigeration and air conditioning equipment is being produced by General Controls Co., Glendale, Calif.



Cataloged as the V-202 (semi-liquid charge) and V-203 (gas charge), the valves respond to small changes in superheat. Their sensitivity is a result of their packless construction and stainless steel push pins. The flange-type convectors provide a connection that is removable for servicing or replacement. They are manumactured in ⅜-. ½-, and ⅝-in. inlet tube sizes, and in ⅝-, ⅞-, and 1⅛-in. outlet tube sizes.

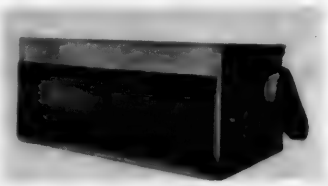
A range of valve capacities is available that includes 2.5, 3.5, and 6.5 tons for Freon 12 or Genetron 12, and 3.5, 5.5, and 10.5 tons for Freon 22 or Genetron 141. Standard models have an internal-external equalizer and an adjustable superheat with a ¼-in. SAE flare. The external equalizer, only, with a ¼-in. ODS connection is optional.

A 60-in. capillary tube is provided with the valves to facilitate their installation.

More information? Circle Item 23 on postcard, page 130.

Coolers Defrost from Inside

A series of glycol defrost product coolers for low temperature refrigeration applications is offered by Bush Mfg. Co., West Hartford, Conn.



The units are available in floor-mounted or ceiling-hung models (illustrated). Their coil construction, called Inner-Fin, permits the units to defrost from the inside.

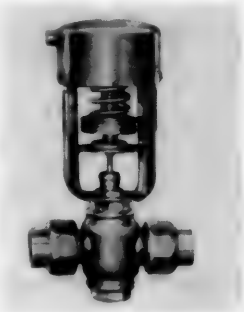
This coil design makes possible a separate defrosting circuit. The defrost circuit consists of a glycol pump, a cast aluminum glycol heater, a timer, and a magnetic contactor. It is furnished as an assembled kit.

The containment of the glycol eliminates the dilution of the defrosting medium, and reduces the danger of defrost failures from freeze-up.

More information? Circle Item 24 on postcard, page 130.

Motor Valve Controls Flow

A bellows-equipped, all-metal motor valve with modulating characteristics has been developed by Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn., for use with hydraulic and pneumatic control systems.



The valve, equipped with a cadmium-plated steel spring and a two-ply seamless metal bellows, is used to control the flow of steam, gas, oil, water, and other fluids. It is employed as a final control element in pneumatic and hydraulic systems to maintain pressure, temperature, or level in industrial vats, tanks, and processes.

According to a survey conducted by the company, the control, called the No. 992-D bellows motor valve, is satisfactory for over 50 per cent of industrial applications where motor valves are used. The valve has a linear movement and is available in sizes from ¼ to 4 in. and in a variety of valve types.

More information? Circle Item 25 on postcard, page 130.

Line of Blower Wheels

End-supported blower wheels, called AC, with corrosion resistance for air conditioning equipment, cooling towers, evaporative condensers, and air washers are manufactured by Morrison Products, Inc., Cleveland, Ohio.

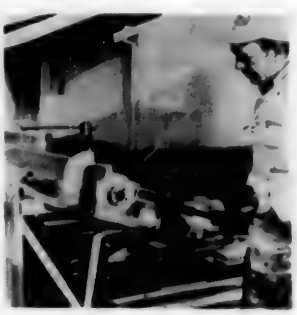
A range of sizes is available with seven different diameters from 10 to 20 in. and nine different widths, from 6 to 20 in. The bore sizes range from ¾ in., on the smaller-size wheels when used in a single unit, to 2 in., when two or more wheels are mounted in a single shaft. Larger bores are available on special orders.

The wheels are made from galvanized steel, finished in an epon resin paint, and baked at high temperature for a prolonged period, to make them corrosion resistant.

More information? Circle Item 26 on postcard, page 130.

Pipe Threader Is Portable

A portable, power-driven pipe threader, called the Lawco Junior, is available from Velocity Power Tool Co., Pittsburgh, Pa. Adapters and a speed reducer enable it to handle pipe from ¼ to 10 in.



The threader weighs 20 lb, is 27 inches in length, and can be carried to where the threading is to be done. It is designed and constructed for one hand operation.

To use the threader, the operator applies the threading dies to the tool, positions the tool, then presses a button, and the power unit drives the cutting dies. It is equipped with a ¾-hp electric motor and a toggle switch to provide reversible power.

The tool can also be used as an auger, for boring post holes, driving bolts and nuts, opening valves, and hoisting weights up to 500 lb.

More information? Circle Item 27 on postcard, page 130.

Unit Tests Air Conditioners

A portable appliance tester, Model 5100, is introduced by Accessory Div., Philco Corp., Philadelphia, Pa. The tester is designed for multi-purpose servicing of refrigerators, freezers, air conditioners, ranges, as well as checking other household appliances and various types of industrial equipment.

In one unit, the appliance tester provides a measurement of power, voltage, current, temperature, and resistance, thereby permitting the user to localize electrical or temperature difficulties within an appliance.

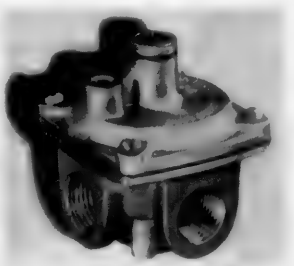
Power voltage, and current are indicated on an electrodynamometer type instrument; no d-c meter with a meter rectifier is employed. A 4-in. micro-ammeter measures temperature and resistance, and a temperature calibration circuit permits calibration check against the thermometer supplied with the tester. In addition, the temperature meter can also be used as an ohmmeter.

Eight scales are provided to cover all of the functions performed by the instrument which weighs 7¾ lb. It can be purchased through the company's distributors.

More information? Circle Item 28 on postcard, page 130.

Gas Pressure Regulators

Pressure regulators for small gas heaters are available in both angle and in-line models from Major Controls Co., Corona, Calif. The regulators, Model H-200-75, are suitable for all gases and can regulate inputs of natural gas up to 88,000 Btu per hr.



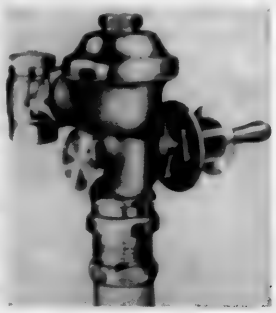
Made of light weight aluminum alloy, the castings for the regulators are cast and machined in the company's plant. To obtain true concentricity and positive diaphragm movement, the guide posts are integrally cast to secure the Nylon fabric diaphragms. The regulators have vise-grip bosses to facilitate their handling for repair or assembly.

Tested and certified by the AGA, the regulators are available in heights of 2 15/16 and 3 3/16 in.

More information? Circle Item 29 on postcard, page 130.

Valve Has 2 Handle Openings

Concealed-type flush valve bodies with two handle openings are being manufactured by Sloan Valve Co., Chicago, Ill. This double opening feature allows the use of the same valve for either left or right supply and will be furnished as standard equipment on all the company's concealed-type Royal, Crown, and Naval flush valves.



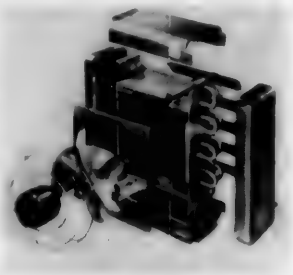
It was developed by the company because the double handle openings eliminate the trouble and extra cost of exchanging flush valves after they have been incorrectly ordered (left or right), or after structural changes in the building make it impossible to install the flush valves as originally planned.

Where columns, ducts, or other obstructions prevent standard roughing-in, the plumber removes the cap from the opposite handle opening, installs the handle assembly there, and closes the other opening with the cap he removed. He then proceeds with the usual roughing-in.

More information? Circle Item 30 on postcard, page 130.

Heater Is Connected in Rear

A propeller fan unit heater for use with steam or hot water heating systems is introduced by John J. Nesbitt, Inc., Philadelphia, Pa.



Constructed of continuous U-bend tubing, the double rows of condensing tubes are partially staggered to increase the heat transfer and reduce the noise level. The male pipe thread coil connections extend through the rear of the unit casing, instead of through the top and bottom. The casing is constructed of die-formed furniture steel and is given a phosphatizing treatment before finishing to increase the bond between the steel and the paint.

There are 24 models of the unit heater available with capacities ranging from 15,000 to 335,000 Btu per hr.

More information? Circle Item 31 on postcard, page 130.

Level Control Has No Float

A floatless-type level control unit, which is an adaptation of probe-type level control units applied to industrial equipment, is made by Techniflex Corp., Port Jervis, N. Y. The unit is designed for domestic and medium size commercial installations, and has a power requirement of 100v a-c.

A transformer contained within the sealed control box reduces signal voltages to prevent electrical hazards.

The electrical hookup to the unit is made through the use of a four-prong plug and socket arrangement furnished with the unit.

The vessel containing the probe is marked externally to show the low water level. As long as the tip of the sensing probe is immersed in water, there is no action. However, when the water level falls below the probe tip, the control or alarm action, or both, is called in via the relay in the sealed control box. As an additional precaution the unit is designed to act in a fail-safe manner.

Where a controlled level range is required and the difference between high-low levels does not exceed 6 in., two probes are furnished in one vessel.

More information? Circle Item 32 on postcard, page 130.

Switch Controls Pumps

A reverse-action device is made by Square D Co., Milwaukee, Wis., for applications requiring protection on loss of pressure, or, to initiate a cycle of operation on rising pressure. The device, Class 9013 Type HRG, is capable of operation at pressures up to 80 psi.

Both single and double-pole versions of the device are available. Its applications include the protection of machinery against lubrication failure and as an automatic safeguard against loss of prime for pumps in irrigation systems.

A toggle and over-center arrangement insures snap action in the make and break of the contacts. The range and differential are adjusted in the field; the differential can be varied from 10 to 30 psi.

More information? Circle Item 33 on postcard, page 130.

Automatic Air Driers

An enlarged and improved line of mechanically refrigerated air driers with outputs from 4 to 55 cfm, is announced by Murphy & Miller, Inc., Chicago, Ill.

Available in five models of ¼, ¾, 1½, 3, and 5 hp, the driers require no manual reactivation because the drying process is accomplished mechanically with automatic cycling controls. They remove moisture by a process of condensation that also removes entrapped oil. A dual, copper tube assembly, a heater, and an automatic control alternately defrost each tank while the refrigeration system provides cooling for the tube previously defrosted.

The capacities of the five models are based on entering air at 80 deg F and 60 psi pressure; increased entering pressure will increase their drying capacity.

More information? Circle Item 34 on postcard, page 130.

3 Larger Size Cooling Units

Three larger capacity models of its packaged summer cooling units are introduced by Janitrol Heating & Air Conditioning Div., Surface Combustion Corp., Columbus, Ohio.

The units, in 8 (illustrated), 10, and 15-ton sizes, are self-contained in console-type cabinets for office, retail, and commercial-industrial installations. Condenser water, drain, and electrical connections are required to operate the units, and their installation does not have to interrupt business.

All three air conditioners are equipped with an hermetically-sealed refrigeration unit, air filters, a slow-speed fan, return air intake, and adjustable air discharge grilles. Moving equipment is isolated from the cabinet panels.

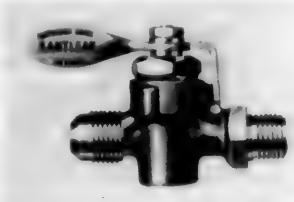
Twin refrigeration circuits are used in the 10 and 15-ton models. On mild days, only one circuit operates to provide humidity control without over-cooling. When it's hot, the second circuit cuts in automatically to provide full capacity cooling.

To convert the units to year-round conditioners, either steam or hot water heating coil accessories can be added inside the cabinet. This arrangement is adaptable to the modernization of existing buildings where a source for steam or hot water heat is available.

More information? Circle Item 35 on postcard, page 130.

Valve Shuts Off Manually

A manual 2-port, straight-through, shut-off valve for fuel oil lines is an addition to the Kantleak line of brass valves and fittings produced by Anderson Brass Co., Detroit, Mich.



Designated the 370C Series, the valve is constructed with a solid bottom and a spring-loaded, packed top to prevent leakage. It also has two exterior 90-deg handle stops to insure proper orifice alignment in the open and closed positions.

Listed by Underwriters' Laboratories, the valve is available in the following end combinations: ¼ and ⅛-in. male or female, or both, pipe thread; and ⅜, 5/16, and ¼-in. ODT flare or ball sleeve.

More information? Circle Item 36 on postcard, page 130.

Air Meter for Field Use

An air meter has been developed by Anemostat Corporation of America, New York, N. Y., as a portable field instrument for the direct measurement of air temperature, velocity, and static pressure. The instrument is useful for balancing, testing, and checking warm air heating, ventilating, and air conditioning systems.

Designated Model 60, the meter measures air velocities from 0 to 8000 fpm, temperatures from zero to 255 deg F, and static pressures in ducts from 0 to 8 inches of water. Instantaneous readings can be taken directly from the instrument, without using timing devices or making further calculations.

With a diameter of ⅜ in., the probe of the meter is essentially non-directive and can be used to obtain readings in free spaces as well as in ducts or other confined areas. The multiple function readings give data on temperature, velocity, and static pressure, and are not affected by ambient temperature.

The dimensions of the instrument are 10¾ x 9¾ x 4⅜ in.; it weighs slightly over nine pounds.

More information? Circle Item 37 on postcard, page 130.

Insulation Panel Is Laminated

An insulation material, called Hasko-Struct, consisting of Fiberglas cloth polyester facing sheets bonded to various densities of plywood and other types of core materials is produced by Haskelite Mfg. Corp., Grand Rapids, Mich.

For the refrigeration industry, the material is being made for walk-in coolers, trailer vans, doors, and similar applications. The material is also used to make special shipping containers. It can be cut with hand or power tools.

A catalog is available from the manufacturer that contains information and charts on the physical properties, impact tests, moisture effects, withdrawal load tests, and typical assembly details of the material.

More information? Circle Item 38 on postcard, page 130.

Die Head for Pipe Threader

A stationary die head for maintenance work is made by Landis Machine Co., Waynesboro, Pa., to be applied to the company's 2-in. pipe threading and cutting machine.

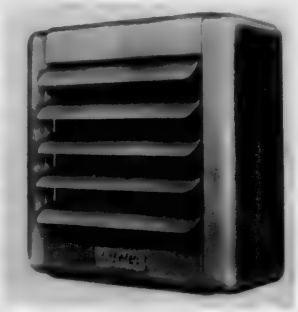
Named Little Lansta, the die head is furnished in two sizes: a ¾-in. head with a ⅛ to ¾-in. pipe range, and a 2-in. head with a 1 to 2-in. pipe range. Designed primarily to replace the die head previously furnished with the machine, it is more rigidly constructed, its locking mechanism has been improved, and its chaser length has been increased by the use of 2½-in. long tangential chasers.

No chaser holder changes are necessary for either head when threading pipe, for the holders can be used for either tapered or straight pipe threading.

More information? Circle Item 39 on postcard, page 130.

Propeller Fan Unit Heaters

A line of 24 propeller fan unit heaters is announced by Warren Webster & Co., Camden, N. J. A universal coil of continuous U-bend construction is used in the design of the heaters to make them suitable for either hot water or steam.



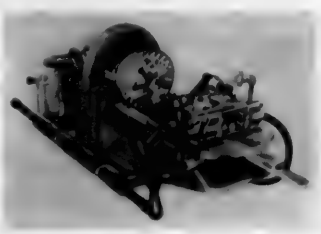
Other features of the heaters are: A provision for back piping connections which makes it possible to install the units closer to the ceiling than was possible with the earlier top and bottom connections; a choice of horizontal or double deflection louvers; fans with a large face area and blade curvature that impart a gradual acceleration to the air stream; motors designed for continuous operation; and, in most sizes, the motor mounting serves also as a fan guard.

The heaters are available in a wider range of sizes because of the addition of smaller units than were previously available. The range of sizes extends from 63 to 1395 sq ft EDR basic steam ratings. The capacities and sound classifications are in accordance with standards adopted by the Industrial Unit Heater Association.

More information? Circle Item 40 on postcard, page 130.

Pipe Threader Is Improved

A portable pipe and bolt threading machine, the Model-A, has been improved by Beaver Pipe Tools, Inc., Warren, Ohio.



The improvement consists of an increase in the operating speed of the machine. It can now thread 2-in. pipe in 10 to 12 seconds and ½-in. pipe in 5 to 8 seconds. It formerly required 20 seconds to thread 2-in. pipe and 12 seconds to thread ½-in. pipe.

The machine is equipped with a wrenchless chuck.

More information? Circle Item 41 on postcard, page 130.

Insulation Enclosed in Foil

A residential building insulation which combines the insulating efficiency of Fiberglas wth the summer reflective characteristics of aluminum foil has been developed by Owens-Corning Fiberglas Corp., Toledo, Ohio, with cooperative assistance from Aluminum Company of America.

The thermal efficiency of the Fiberglas insulation is enhanced by the aluminum foil which, in summer, reflects the heat from the sun's rays outwardly. The outer, or breather, side provides a reflective surface which turns back hot summer heat. It is perforated to avoid any buildup of moisture in the insulation. The aluminum foil on the other side acts as a vapor barrier.

The foil-enclosed insulation is produced in both batts and roll blankets of fine fibers of glass and has the usual flanges for nailing or stapling to wall studs and floor joists. It is available in widths of 15, 19, and 23 in. for use with studs spaced 16, 20, and 24 in. on center and in thicknesses of 2 and 3 in. Depending upon their width and thickness, the roll blankets are available in lengths up to 60 ft, while all batt blankets are 4 ft long.

More information? Circel Item 42 on postcard, page 130.

Appliance Blower Wheels

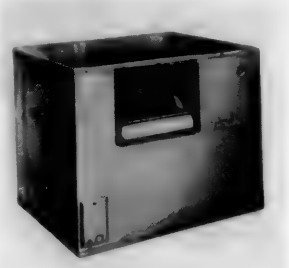
Blower wheels with forward-curved blades have been designed by Revcor Co., Carpentersville, Ill., for use in appliances such as room air conditioners, dryers, furnaces, and oil burners.

Available in either steel or aluminum, the wheels are made in 18 different diameters from 2-9/16 in. to 12⅜ in., in both single and double inlet types.

More information? Circle Item 43 on postcard, page 130.

Air-Cooled Air Conditioners

Air-cooled summer air conditioners are added to the series of commercial and residential, water-cooled summer air conditioners offered by Thatcher Furnace Co., Garwood, N. J., to increase its selection of equipment.



The air-cooled summer air conditioner includes a remote-located condensing unit (illustrated), which can be installed indoors or outdoors, wherever air circulation can be maintained. Refrigerant-carrying copper tubing connects the condenser with a direct expansion cooling coil. The coil can be set anywhere in the air supply system, using the existing ductwork to distribute the cool, dehumidified air. The unit is suited for commercial applications, such as restaurants, and drug and grocery stores.

Fabricated of heavy-gage steel, the condensing unit consists of a 4-row copper tubing condenser coil; a gas-cooled, hermetically-sealed meter compressor; a welded steel receiver, equipped with safety pressure-relief; and a continuous-duty blower.

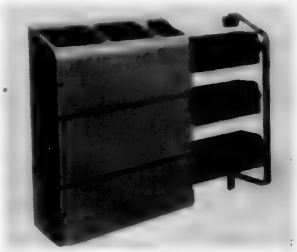
Flanged on both sides to simplify its connection to ductwork, the cooling coil is available for both horizontal and vertical air flow applications. For systems where blowers are required with the cooling-coil, the company is introducing a housed blower-coil assembly.

The air-cooled units are being produced in 3 models, with condenser units of 2, 3, and 5 hp and cooling coils of 2, 3, and 5 tons; blower-coil assemblies also come in 2, 3 and 5 ton capacities.

More information? Circle Item 44 on postcard, page 130.

Reinforced Baseboard Enclosure

An enclosure designed for fin pipe radiation is offered in the Hi-Therm line of radiation manufactured by Stedco Products, Wilkes - Barre, Pa.



Called Tuf-Top, the enclosure is recommended for installation in schools, public auditoriums, public buildings, or other institutions and buildings where rough use or abuse to an enclosure can be expected. To give strength and rigidity to the enclosure, heavy-duty cover supports mount on the wall and provide support to the enclosure cover.

Available for single, double, or triple tier radiation, the enclosure can accommodate both 1¼ and 2-in. pipe size fin pipe radiation.

More information? Circle Item 45 on postcard, page 130.

Two Valves Added to Line

With the addition of copper compression-type and sweat-type valves, 250 different size and style combinations are available from the Speedway line of chrome shutoff valves made by Brass-Craft Mfg. Co., Detroit, Mich.

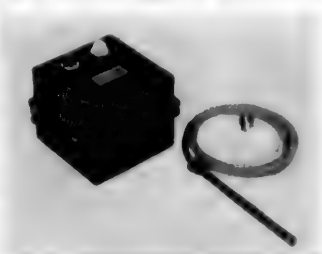
Designed for 100% copper installations, the two inlet types do not require chrome nipples or adapters. They also reduce the possibility of breaking fittings caused by pipe expansion and electrolysis caused by the contact of unlike metals.

Both valve types are available in ½-in. OD (⅜-in. nominal) inlet and ⅝-in. OD (½-in. nominal) inlet, straight and angle. They are manufactured in combinations of regular bonnet, stuffing box, lock shield-loose key, and lock shield-screw driver, with finishes of polished chrome, brushed chrome, and rough unplated.

More information? Circle Item 46 on postcard, page 130.

Device Senses Liquids

A liquid-sensing unit that detects the presence of liquid in 0.4 sec and the absence of liquid in 5 sec is being manufactured by Air Associates, Inc., Orange, N. J.



The unit consists of an electrically powered probe containing a tiny, thermally-sensitive electrical resistor, a power-control package, and an interconnecting cable. Its control unit can be obtained in either explosion-proof or vapor-proof models. Multiple probe types are available for applications in which several chain operations are required to be automatic.

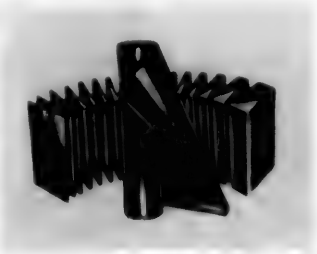
Some applications for the device are in fuel systems as a low-level warning indicator or as a high-level cutoff switch when tanking up; to sequence liquid from one tank to another when predetermined levels are reached; and merely to indicate the presence or absence of a liquid. It will operate visual or aural alarms and control pumps, valves, or motors in response to changes in liquid levels.

The sensing unit has functioned in oil, water, liquid oxygen, gasoline, and several other types of fluid in a liquid temperature range from −319 to +200 deg F.

More information? Circle Item 47 on postcard, page 130.

Sheet Rubber Packing

Sheet rubber packing is offered in a range of thicknesses and widths from Boston Woven Hose & Rubber Co., Boston, Mass.



Available in thicknesses from 1/16 to 2 in., and in widths from 36 to 72 in., the packing is used as flange gasket material for air, hot or cold water, saturated steam, and hydraulic services. It is also used for bumpers, mounting pads, and general gasket service applications.

A pamphlet published by the company describes the recommended applications, available sheet and sizes of the packing, and information for its use with government specifications.

More information? Circle Item 48 on postcard, page 130.

Room Cooling Thermostat

A room thermostat for use on air conditioning applications is offered by White-Rodgers Electric Co., St. Louis, Mo.

The thermostat maintains room temperatures by means of a small resistor placed in parallel with the cycling contacts of the thermostat.

When the contacts are closed, no current flows through the resistor as it is shorted out by the contacts. When the contacts are open, the resistor is in series with the control transformer, the motor starter, and the relay coil or refrigerant valve.

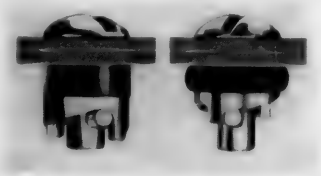
Because of its high resistance, not enough current flows through the resistor to operate the low voltage cooling equipment control, but enough will pass through to add a certain amount of artificial heat to the sensitive element of the thermostat during the off period. This enables the thermostat to hold the operating differential to a minimum and insure uniform room air temperature.

The thermostat is also available with a manual selector switch, from which Cooling-with-Fan, Fan-Only, or System-Off operation can be obtained. It is designed in ivory and chrome and can be obtained with or without the hinged cover.

More information? Circle Item 49 on postcard, page 130.

Fastener Locks in Half-Turn

A half-turn panel-to-base fastener, called the Vibrex, which combines the functions of a positive lock with those of an elastic shock mount and vibration isolator, is manufactured by Vibrex Fastener Corp., Mt. Kisco, N. Y.



The fastener compensates for misalignment between a panel and its base. It is attached to a hole in the removable panel and locks in a plain hole in the base. The locking action results from the expansion of a rubber sleeve (right), which exerts a locking pressure of over 150 lb. A half-turn locks or disengages the fastener.

A variety of different types is in production, including latches for cabinet doors and drawers, anti-vibration mounts, gasket holding fasteners, and instrument types, which combine a bottom panel holder and a cabinet bumper in a single unit.

More information? Circle Item 50 on postcard, page 130.

Demineralizer Is Automatic

An automatic mono-column demineralizer, the MA-200, designed to purify 200 gph of water is offered by Penfield Mfg. Co., Meriden, Conn. A packaged unit, the demineralizer requires for its installation an influent connection to a plant's water system and an effluent connection to points where the purified water is required.

Whenever the effluent's resistivity falls below standard, the treated water is automatically discharged and lights, or other warning system, signal the need for activation of a regeneration cycle.

A turn of a switch puts the unit through its regeneration cycle automatically, including rinsing and recutting in the effluent when the desired resistivity is reached. During this the regenerative tanks are automatically refilled with water so that fresh acid and caustics can be added in preparation for the next regeneration cycle.

More information? Circle Item 51 on postcard, page 130.

Paper Thermometers

A graded series of sealed-in-glass temperature indicators, which change appearance irreversibly from white to black at predetermined temperatures, is introduced by The Paper Thermometer Co., Natick, Mass. The indicators consist of a strip of paper sealed in a glass tube, and have an accuracy of ± 1% of their rated temperature.

If a tube is placed at a location or within an object whose temperature is to be read, it will show a sharp white to black color change when the surrounding temperature equals or exceeds the rated temperature. Two or more tubes can pinpoint the object temperature.

The change in color is irreversible, thus making the tubes useful for reading temperatures in inaccessible places, or under conditions where temperatures can be determined only by subsequent examination. Some of the uses listed by the manufacturer include fire protection studies, shipping and storage temperatures, sterilization temperatures, and recording temperatures of drying, baking, and curing operations.

Available in 38 different temperature ratings from 100 to 470 deg F, the tubes are packaged 25 to a box.

More information? Circle Item 52 on postcard, page 130.

Plates Control Scale

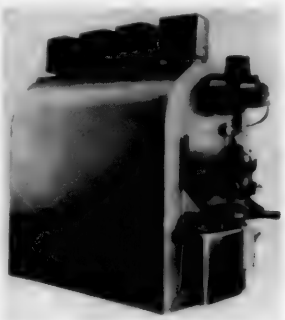
A method of controlling scale and corrosion in the recirculating cooling water systems of air conditioning, refrigeration, and other cooling equipment has been developed by Calgon, Inc., Pittsburgh, Pa. The method uses plates, called Micromet, made of slowly-soluble phosphate.

Up to 10 lb of the plates can be put in a plastic mesh feeding bag, which is hung directly in the water spray inside the cooling tower or the evaporative condenser. One or two bags of plates are used for each 20 tons of capacity, and a single charge will last six months. The plates are available in 5-lb cans and 100-lb drums.

More information? Circle Item 53 on postcard, page 130.

Large Space Heaters

Direct-fired space heaters, called Commercial-Aire, are being manufactured for large warm air heating applications by The Mammoth Furnace Co., St. Paul, Minn. The heaters are being made with outputs ranging from 300,000 to 2,000,000 Btu per hr at the bonnet.



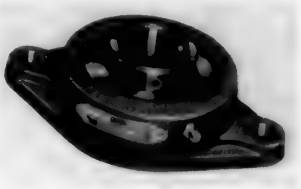
Discharge heads can be used on the heaters (as illustrated) or they can be installed into ductwork, or a combination of both. They can also be supplied with the blower compartment separate for air conditioning installations and with face and bypass dampers in the standard Series FD heater. Floor, suspended horizontal, and suspended inverted installations can be made with standard units which require no major modifications.

On models of 550,000 Btu per hr output and larger, blower noise is reduced through the use of a 3-in. hollow shaft supported at the ends by self-aligning, pillow-block bearings.

More information? Circle Item 54 on postcard, page 130.

Bearing Unit Uses Two Bolts

A two-bolt flange ball bearing unit is being marketed by Sealmaster Div., Stephens-Adamson Mfg. Co., Aurora, Ill. Interchangeable with the four-bolt flange units on the diagonal bolt hole dimension, the bearing is available in shaft sizes from ½ to 2 3/16 in. The two-bolt flange unit has the same design features as the four-bolt, self-alignment with locking pin and dimple and labyrinth seal.



On new installations the bearing eliminates two fasteners as well as the punching or drilling operation for two mounting holes. In addition, it allows for closer bearing spacing on multiple shaft installations. As a replacement bearing, the unit fits the diagonal bolt centers on present four-bolt base flage units and carries the same load rating for a given shaft size.

More information? Circle Item 55 on postcard, page 130.

Pipe Has Mechanical Joint

Vitrified clay pipe for homes, industries, and sanitary systems, is announced by Robinson Clay Product Co., Akron, Ohio.

Named Wedge-Lock, the pipe has an integral, double-ball mechanical joint that is cast inside the bell and on the spigot of the clay pipe. It can be installed under basement floors, in structural walls, and in sewer connections for homes and other structures. Both the bell and spigot castings are coated with an adhesive and pushed together by hand or with a metal pinch bar.

Available in both standard and extra-strength, the pipe is made in 4-, 6-, and 8-in. diameters. Matching fittings and a special union for jointing cut ends are also manufactured by the company.

More information? Circle Item 56 on postcard, page 130.

Absorption Refrigerating

Absorption refrigerating machines, which have no major moving parts and produce chilled water from hot steam, are available from Carrier Corp., Syracuse, N. Y., for large-capacity air conditioning and process cooling installations in a range of 11 sizes, from 100 to 700 tons.

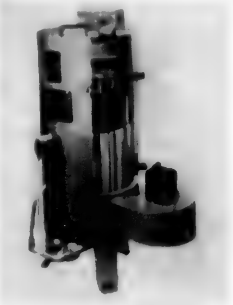
The machines, which will adjust automatically from full down to virtually zero load, are designed to produce low-cost cooling where an economical source of heat, such as natural gas, in available. They are also suitable when a source of low pressure steam is available from the heating boiler, as a by-product of a process using steam, or from district steam lines.

The machines can be installed on the roofs of skyscrapers or other buildings without special reinforcing or bracing.

More information? Circle Item 57 on postcard, page 130.

Three-Way Trailer Heater

A hot water heater that provides radiant floor heating and separate hot water for the kitchen has been developed for house trailers by Vapor Heating Corp., Chicago, Ill. Called the Waikiki Caban heater No. 4905, it provides heat in three ways: hot air, hot water, and separately heats water for the kitchen.



The heater is 80% efficient, turns on and off automatically, burns propane or city gas, and puts out 40,000 Btu per hr, which is ample to heat a good size trailer, cottage, or bunk-house trailer used by construction crews.

Hot gasses heat the water in the water jacket as they go up through twelve steel pipes welded into the water jacket. This heated water is then circulated by a pump through floor heat piping or radiators in the trailer. A blower on the heater circulates air up through the heater between the water jacket and metal covered, spun glass insulation. The circulated air is then directed out hot air ducts in the trailer. Hot water for the kitchen is heated as it goes through a copper coil located inside the water jacket.

Designed to fit in a small compartment of a trailer, the heater is 39 in. high, 24 in. wide, 20 in. deep overall, and weighs 130 lb.

More information? Circle Item 58 on postcard, page 130.

Clamp Holds Blueprints

A device for holding building or engineering plans is introduced by Plan Hold Div., Air Comfort Co., South Gate, Cal.

Designed to fit an existing plan rack or file, the device will hold one or one hundred fifty prints without the necessity of punching or drilling holes in them. Prints can be added or removed from it without disturbing other prints.

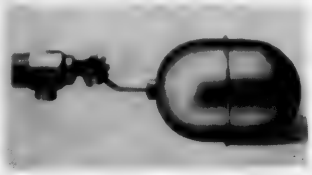
Loosening two wing nuts opens the holder; tightening them closes it. The wing nuts and studs are located on the end of the holder and are not in contact with prints.

The holder is made of satin-finished aluminum, and its corners and edges are rounded. Soft plastic tips on its ends prevent it from scratching or marring desks and reference tables.

More information? Circle Item 59 on postcard, page 130.

Valve for Air Conditioners

An automatic control for the water intake on air conditioning units and humidifiers is made by Reitman Mfg. Co., Oakland, Calif.



Known as the Jiffy Action valve, the control automatically shuts off the water supply once a preselected water level has been reached. The selection of the water level is made by applying pressure with a finger on a spring tension stud which permits the proper positioning of the float arm.

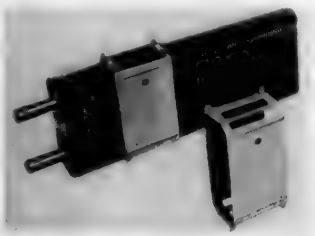
The valve is available in two models: Model No. 202 is equipped with a standard ½-in. thread for connection to water pipes; and Model No. 303 is a 3-way valve with a combination pipe and hose connection. The latter connection allows the valve to be connected to a ¼ or ½-in. pipe, or to an ordinary garden hose when used as a water supply system for small home air conditioners and humidifiers.

Both models can be used in industrial plants, since their parts are made of brass and stainless steel.

More information? Circle Item 60 on postcard, page 130.

Baseboard Coil Bracket

A two-piece, snap-around sliding shoe assembly is being made by Kritzer Radiant Coils, Inc., Chicago, Ill., for its dual tube baseboard heating coils.



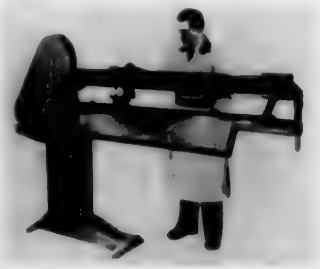
The shoe assembly protects the sides of the coil and permits the coil to be slid on the brackets while keeping the edges of the fins from touching either the front or back of the baseboard cover.

Tabs on one side of the shoe assembly are engaged into slots on the other. Snapping the tabs into the slots locks the two halves together at the diagonal corner. Cutouts in the two halves permit full air flow through the coils.

More information? Circle Item 61 on postcard, page 130.

Seam Closer Has Single Horn

A lateral seam closer that is engineered to form seams in flat or round ducts with a single horn is announced by The Peck, Stow & Wilcox Co., Southington, Conn.



The single horn accepts round, square, and rectangular work. It is designed with five separate working faces to pre-form and finish inside and outside seams and Pittsburgh locks. It can be secured in any of its five working positions with a single screw adjustment.

The seam closer is powered by a 1½-hp, 1800-rpm motor with a magnetic starter. The motor is connected by a V-belt drive with an endless roller chain and actuates the carriage at a speed of 100 fpm.

More information? Circle Item 62 on postcard, page 130.

Intermittent Control Switch

A 24-hr time switch that controls intermittent operations, including day or night shutdowns automatically, has been developed by Zenith Electric Co., Chicago, Ill. The switch is adapted for marginal operation of oil well pumps; cycling of processing equipment; heating, ventilating and air conditioning systems; stokers; and oil and gas burners.

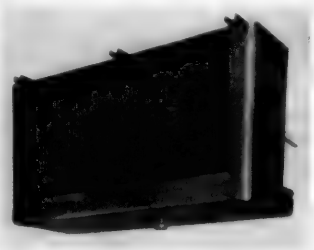
The dial of the switch is scaled in 15-min graduations which can be set for as many as 48 on and 48 off operations to automatically repeat a 24-hr schedule. Adjustment for a complete schedule is made by sliding trip levers in or out on the dial. The switch is available with or without a calendar device to cut out nonworking days.

The overall dimensions of the unit are 8¼ in. high, 6½ in. wide, and 4½ in. deep. Its rated capacity is 1000 watts, and it operates on 60 cycle a-c, 110 or 240v.

More information? Circle Item 63 on postcard, page 130.

Three Types of Unit Coolers

Unit coolers called Flocold are introduced by Drayer-Hanson, Inc., Los Angeles, Calif. Three types are available: unit coolers for room temperatures over 34 deg F; unit coolers for Freon with water defrost; and unit coolers for ammonia with water defrost for temperatures above or below 34 deg.

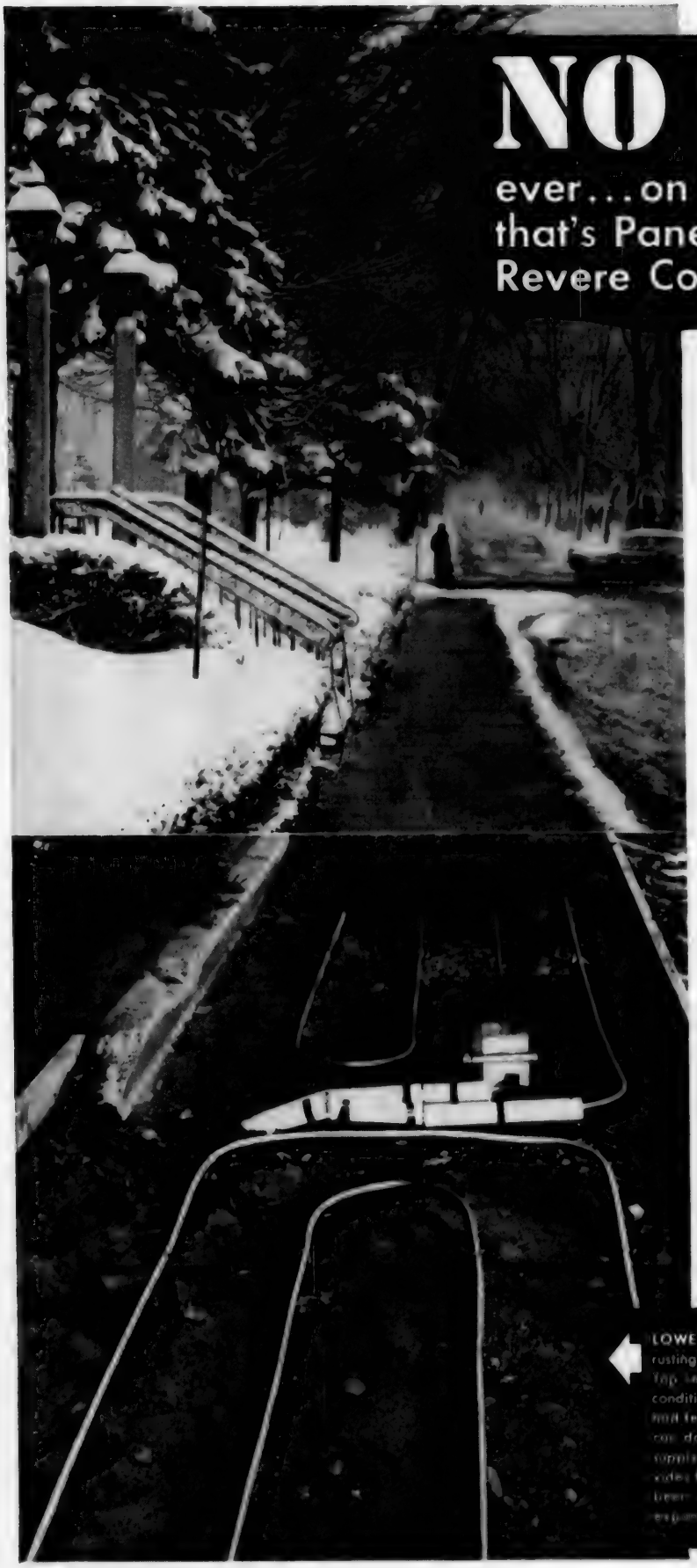


For temperatures over 34 deg, the units are available in 11 different models, with capacities ranging from 340 to 4800 Btu per deg temperature difference. The water defrost units are available in 7 models, with capacities ranging from 457 to 3600 Btu per deg temperature difference. The units for ammonia with water defrost are manufactured in 4 models, with capacities ranging from 1200 to 3600 Btu per deg temperature difference.

The ammonia coils are made of steel and are galvanized after fabrication. The Freon units have aluminum fins and copper tubing.

More information? Circle Item 64 on postcard, page 130.

(*Continued on page* 124)



NO SNOW

ever...on the sidewalk that's Panel Heated with Revere Copper Water Tube

Huge strides are being made by this method of snow removal. No wonder, shoveling and accidents due to snowy walks are eliminated . . . while the time and labor saved pays for the installation in short order.

That's why you'll find snow melting panels also being used on driveways, loading platforms, entrance aprons, service stations, pedestrian ramps at railroad stations, airports and similar spots. One application which bears special mention is the use of coils in garages. They quickly melt the snow on cars, keep floors dry as well as keep the repair shop floors warm so mechanics can lie right on the bare concrete in comfort.

And when you make the panels of Revere Copper Water Tube you have these added advantages: Copper can be bent to conform to the terrain. Bendability permits use of sinuous coils, while the 60-foot lengths of tube mean fewer fittings which, when joined by solder means joints that stay tight. Copper tube cannot rust, rot or deteriorate. That's why, on the inside, full flow and low frictional resistance are maintained throughout its long life. While external moisture will not harm it from the outside.

Keep ahead of the parade. Recommend Panel Heating for snow removal. Revere's Technical Advisory Service will be glad to help you in the proper application of Revere Copper Tube in working up your plans.

FREE! Instructive 16mm Full Color Motion Picture, "The ABC of Radiant Panel Heating." Write Advertising Department for details.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

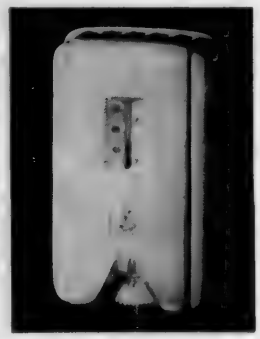
Mills: Baltimore, Md.; Brooklyn, N. Y.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Newport, Ark.; Rome, N.Y.
Sales Offices in Principal Cities, Distributors Everywhere.

LOWER SECTION OF PHOTOGRAPH shows how a rustless Revere Copper Tube was embedded in concrete slab. Top section of photo shows same work in the actual snow conditions. Note bends. Think of all the joints necessary had ferrous pipe been used. And think how Revere tube can do its suitable materials. Note manifold used at each supply and return line to the coils from the mains. This provides flexibility in the tube offs from the mains, which have been run below the slab, to allow for movement due to expansion and contraction.

(*Continued from page* 122)

Combination Wall Thermostat

A wall thermostat that will control both heating and air conditioning equipment has been developed by Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn., and is called the combination thermostat No. 801-A3.



The combination thermostat has a differential of plus-or-minus ½ deg F and can be employed with heating plants and air conditioning units. It requires a connection with a manually - operated, summer-winter switch to provide the change from heating to cooling, and vice versa.

The unit, which is approved by Underwriters' Laboratories, has a switch rating of 20 amp, non-inductive at 250v a-c; a ¾-hp motor load at 115v a-c; and a 1½-hp motor load at 230v a-c. It is designed for installation in homes, factories, and commercial establishments, and does not require adapter plates or special mountings. The unit mounts directly on a standard 2 x 3-in. switch box with two screws.

Powered by a seamless metal bellows, the thermostat has a temperature range between 64 and 80 deg F. Its plastic case, which extends 1-7/16 in. from the wall, is of modern design. A circular plastic dial calibrated in degrees provides the temperature selection.

More information? Circle Item 65 on postcard, page 130.

Tool Fastens Cable and Tube

A hand-operated stapler that will fasten electric cable lines and copper tubing, for radiant heating, is manufactured by The Heller Co., Cleveland, Ohio.

Using the stapler, one man can draw cable or tubing with one hand while fastening it with the other. The tool loads heavy wire staples in leg lengths up to ¾ in. long. Its automatic chamber feeds the staples, one at a time, into a driving hammer. The driving hammer is released by trigger action.

To avoid fracturing the material, the staples are set around the cable or tubing to a predetermined depth.

More information? Circle Item 66 on postcard, page 130.

Improved Submersible Pump

An improved model, No. 109, submersible pump for cable and transformer vaults, manholes, and other sumps is announced by Kenco, Inc., Lorain, Ohio.

The ⅓-hp motor and pump are housed in a single watertight case 11⅛ in. high, so that the entire unit is placed in the sump. Water rising in the sump, traps air in the skirt of the switch, creating an air head. When water rises to the predetermined height in the sump, the air head flexes a diaphragm in the switch, closing the switch contacts and starting the motor.

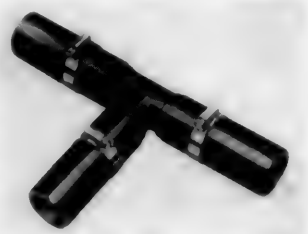
Although the standard pump can be adjusted on the job to turn on at various predetermined heads of water up to 16 in., the standard turn-on point set at the factory is approximately nine inches from the sump floor. The pump shuts off when water is removed to within ⅝ in. of the sump floor. Special models are available for 3, 5, or 7-ft turn-on.

The pumps are available in 115- and 230-v, a-c, in three models: 109N for installations requiring continuous or manual operation; 109A for completely automatic operation; and 109MA for manual starting and automatic stopping.

More information? Circle Item 67 on postcard, page 130.

Clamp Connects Plastic Pipe

Several series of Sure Tite stainless steel clamps for making connections on flexible plastic pipe are announced by Wittek Mfg. Co., Chicago, Ill.



Available in standard sizes, the clamp consists of a patented, one-piece stainless steel housing permanently attached to a stainless steel clamp band. The housing supports a worm-drive screw which engages with the band. After the band is properly positioned on the pipe, it is securely tightened with a screwdriver.

Catalog page PP-455 illustrates and describes the construction of the clamp and its application to flexible plastic pipe.

More information? Circle Item 68 on postcard, page 130.

Aluminum Foil Pipe Cover

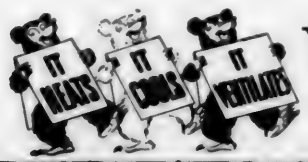
Aluminized pipe jacketing which is resistant to fire, acid, and water, has been developed by United States Rubber Co., New York, N. Y.

Made of aluminum foil laminated onto vapor-proofed asbestos cloth, the jacketing can be used to cover pipe insulation in heating, piping, refrigeration, and air conditioning systems in electric utility and industrial plants and commercial and institutional buildings. Called Asbestos pipe insulation jacketing, it requires no painting.

The aluminized jacketing can be cleaned and does not absorb odors, properties which suit it for use in breweries, food processing plants, and laboratories. A square yard weighs 12 oz.

More information? Circle Item 69 on postcard, page 130.

(*Continued on page* 126)



Year 'round comfort for institutional or commercial installations . . .

without costly duct systems!

Modine AIRditioners are the modern, economical way to air-condition old or new buildings

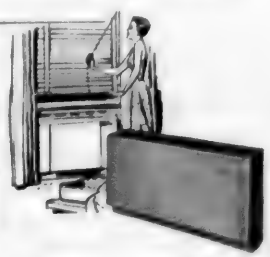
Modine AIRditioners eliminate expensive duct systems and structural alterations. Cold water from a central chiller is piped to each unit for summer cooling. Heating water is supplied by a central boiler. The same piping — water supply and drain — serves for both cooling and heating. Yet, AIRditioners are individually controllable by room occupants.

Choice of four distinct types. Contact the Modine representative listed in your classified phone book or write for Bulletin 754-D — MODINE MFG. CO., 1511 DeKoven Ave., Racine, Wisconsin.

CEILING MODELS — deluxe units for exposed overhead installation. Save floor and wall space.

OVERHEAD MODELS—available with or without plenum and filters for use in furred overhead space.

CONCEALED MODELS — (front panel cutaway) Designed for easy, in-the-wall installation.



CONSOLE MODELS — for free-standing installation. Can also be recessed so only 6 inches of cabinet shows.

Modine Airditioners*

*Trademark

A-1262

(*Continued from page* 124)

Small Throttling Valve

A 6-in. high, automatic diaphragm control valve is added to the Bantam line of valves made by George W. Dahl Co., Bristol, R. I.

A miniaturized throttling valve, it weighs 3¼ lb, and will provide low hysteresis and instantaneous response on service up to 1000 psi, at 350 deg F, over a 3 to 15-psi control air range.

All the materials used in the construction of the valve are consistent with control valve specifications, including stainless steel and Teflon. Direct or reverse action, top-mounted positioners, and handjacks are available with the valve.

The valve shown has five sizes of linear, equal percentage, or quick opening plugs, 3/16 in. and below.

More information? Circle Item 70 on postcard, page 130.

Control Board for Stokers

A panel control board with standardized basis control circuits for its stokers is available from The Will-Burt Co., Orrville, Ohio. For multiple stoker installations, panel controls can be supplied to permit the operation of one stoker, all stokers simultaneously, or a combination of stokers.

Standard controls on the panel include disconnect switches, selector switches, hold-fire controls, and a programming clock. The control boards can be pre-wired when specified, with the wiring layout and connections tested and inspected for compliance with national electrical codes. When required, induced draft fan control, sequence damper control, and over-fire air control can be made a part of, or interconnected with, the standard control panel boards.

More information? Circle Item 71 on postcard, page 130.

Manual Reset Valves

Manual reset valves, series 81G, have been designed by Combustion Control Div., Electronics Corporation of America, Boston, Mass., for use with Fireye flame failure safeguard systems, which shut off the flow of fuels in oil and gas burners in cases of faulty operation.

The system shuts off the valves in the event of flame failure, fan or pump failure, loss of electrical power, faulty operation of pressure or temperature limit switches, time delay relays, or other interlocks in the burner control circuit. The manual reset mechanism prevents re-opening of the valve unless the electric holding coil is energized.

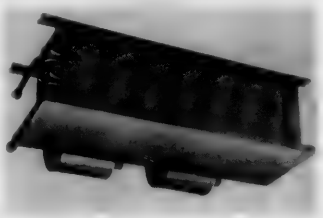
UL and FM approved, the valves are available in sizes from 1 to 4 in. for use with manufactured, natural, mixed, or LP gas, and in 1 and 1¼ in. sizes for use with preheated No. 5 or 6 oil.

Installation information is contained in Bulletin CV-31.

More information? Circle Item 72 on postcard, page 130.

Remote Room Air Conditioner

A remote room air conditioner has been designed by A. H. Witt Co., Los Angeles, Calif., for use in hotels, motels, hospitals, and offices. The unit does not use ductwork and is installed by connecting it to the piping of a cooling or hot water system.



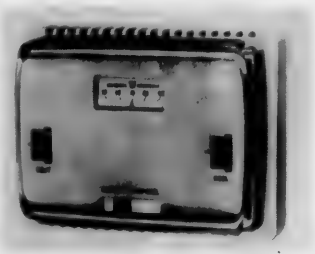
Controlled individually, the air conditioner can be used with a direct-expansion system, a combination heating and cooling water system, or with a direct-expansion and steam system. It consists of flat continuous aluminum fins with full-length collars, copper tubes, and a double aluminum drip pan with a drain connection made of ⅝-in. aluminum tube. The underside of the upper drip pan is insulated to provide an insulating air space that will prevent condensation on the outside of the pan.

The units are furnished in 14 sizes, from 300 to 1200 cfm, in addition to larger models designed mainly for use in a duct system.

More information? Circle Item 73 on postcard, page 130.

Thermostat Has Single Switch

A thermostat with a single selector switch to operate summer and winter air conditioning is offered by General Controls Co., Glendale, Calif. The unit, called the T-231, has an exterior of satin-finished stainless steel and a gray plastic back plate. It extends less than 1⅞ in. from the wall.



Separate roll-type temperature selection dials for heating and cooling are marked with numbers. The dials are located on the face of the thermostat to reduce the possibility of wall smudges by the fingers of the user. A bimetal thermometer on the thermostat permits reading the room temperature.

The selector switch gives a choice of four position settings. The standard unit provides off, heat, fan and cool. Other variations include cool (fan intermittent), and cool (fan continuous).

More information? Circle Item 74 on postcard, page 130.

(*Concluded on page* 128)

Installing Bethcon air-mixing chamber in the air-conditioning and ventilating system of a large Western building.

HOW BETHCON IS BETTER

When you run into a tough forming or drawing operation, turn to Bethcon galvanized steel sheets. Bethcon's zinc coating is superior to that on regular galvanized sheets, and gives better results under extreme conditions. The reason: Bethcon is galvanized on Bethlehem's continuous lines, rather than by ordinary hot-dip methods. Resulting from years of research, the Bethcon coating solves many problems for sheet metal users.

TIGHTER — The Bethcon coating is more adherent and holds tighter to the steel. This means the coated sheet will take severe drawing or forming without flaking or peeling.

MORE UNIFORM — The zinc is distributed more evenly over the entire Bethcon sheet. The heavy zinc bead usually found on the drip end of ordinary galvanized sheets is eliminated.

BETTER LOOKING — The spangles on Bethcon sheets are bright, uniform and attractive in appearance.

Bethcon is made in sheets or coiled strip, 16-gage or lighter. Either plain carbon steel or Beth-Cu-Loy (copper-bearing) steel can be used for the base metal, depending on your requirements. You can readily get complete information on Bethcon galvanized steel sheets by calling or writing the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

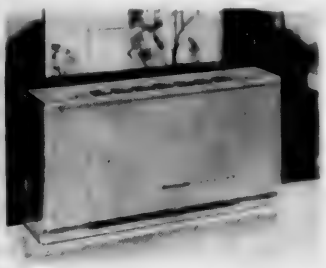
BETHLEHEM STEEL

BETHLEHEM STEEL

(*Concluded from page 126*)

Cabinet Air Conditioners

A line of remote-type cabinet air conditioning units for heating and cooling is announced by Heating Div., Fedders-Quigan Corp., Trenton, N. J.



Called Fedair, the units are designed for heating with circulating hot water and cooling with cold water from a remote source such as a well, cooling tower, or remote condensing unit. They perform six functions, including heating, cooling, ventilating, circulating, filtering, and dehumidifying. The heat transfer element, blowers, motor, filter, and air inlet dampers are housed in the cabinet, with room provided for controls.

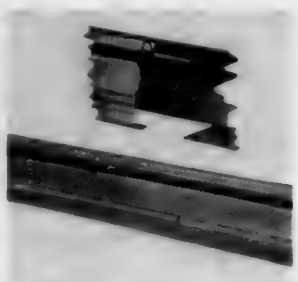
An inlet in the rear of the cabinets provides for the introduction of outside air, if desired, and an adjustable damper controls the amount of fresh air to be blended with recirculated air.

Available in three capacities, the air conditioners can be installed as free standing units or recessed into the wall up to 5 in. Three pipe connections are required to the units for supply, return, and drain.

More information? Circle Item 75 on postcard, page 130.

Diffuser Has Rotary Damper

A baseboard perimeter diffuser is announced by Air Control Products, Inc., Coopersville, Mich. Designated the No. 188, the unit has a built-in rotary damper and a sliding base strip.



An integral part of the face, the damper can maintain a constant air pattern at any degree of opening. One man can balance the unit from the face by a set screw adjustment.

To install the diffuser, the sliding base strip is pulled out to the desired duct width, cut off, and the cut-off portion of the strip inserted at the other end of the diffuser. The sliding base permits a duct location at any point along the diffuser.

More information? Circle Item 76 on postcard, page 130.

Gas Valve Has Spring

A gas valve which combines the safety features of fixed-adjustment lock nut valves with spring-loaded plug valves is being made by The Deutsch Co., Los Angeles, Calif.

The valve is basically a fixed-adjustment type with a spring to compensate for wear or displacement of lubricant. The spring is contained within the head of the plug to prevent the plug from becoming unseated.

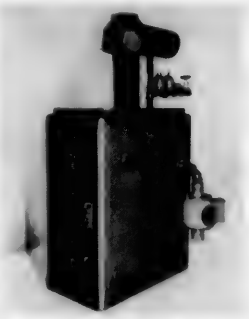
Brass or steel bar stock is used for the body of the valve and brass for the plug. When steel is used for the body, it is protected against rust and corrosion by cadmium plating.

Currently, the valve is available with either $\frac{3}{8}$ or $\frac{1}{2}$-in. female iron pipe size on one end, and on the opposite end either $\frac{3}{8}$ or $\frac{1}{2}$-in. female iron pipe size, $\frac{3}{8}$ or $\frac{1}{2}$-in. male iron pipe size, hose end with $\frac{1}{8}$-in. male iron pipe size, or for $\frac{3}{8}$, $\frac{1}{2}$, or $\frac{5}{8}$-in. SAE flared tubing connection. The valves are listed by the American Gas Association for use with natural, manufactured, mixed, or liquid petroleum gases.

More information? Circle Item 77 on postcard, page 130.

Water Heating Boiler

A gas-fired, hot water heating boiler for radiant, convector, baseboard, and closed systems is being marketed by Ward Heater Co., Los Angeles, Calif.



Available with or without trim, the boiler, Model 1040-B, is autmoatic and is designed for both left and right hand inlets. Its heat exchanger is made of copper tubing with integral fins, and the boiler is equipped with low-voltage controls. The modulating safety control valve has a dial setting from 100 to 200 deg F to prevent overheating and excessive on-off firing.

The boiler is made with input ratings of 104,000 Btu per hr and higher. It is 35 in. high, $14\frac{1}{2}$ in. wide, and $27\frac{1}{2}$ in. long.

More information? Circle Item 78 on postcard, page 130.

Power Roof Exhausters

Three types of axial mushroom power roof exhausters have been designed for industrial and commercial applications where a moderate range of fan operating noise level is of minor importance by Chicago Blower Corp., Franklin Park, Ill.

The exhausters are furnished with three types of blades: one, Type E, is designed for large volume and low static pressure; the other two, Types N and W, are axial airfoil types for higher static requirements.

Suitable for warehouses, industrial buildings, laundries, and power plants, either with or without duct systems, the exhausters can also function as fresh air supply units by reversing the direction of air flow.

Bulletin CAM-102, issued by the company, gives the specifications and performance tables of the exhausters.

More information? Circle Item 79 on postcard, page 130.

PRODUCT INFORMATION SERVICE

Use the postage-free postcard below for further information on:

- **News of Equipment and Materials**

or a copy of the following

- **New Catalogs**

Circle the item Numbers in which you are interested and print clearly your name and address with title.

NEW CATALOGS

LITERATURE ON UNIT COOLERS—Unit coolers for ranges of temperatures over 24 deg F are described in literature available from Drayer-Hanson, Inc., Los Angeles, Calif. Colored in red and brown-tone, the brochure, No. C-141, is comprised of photographs of the basic unit, dimensional drawings, and construction-performance data. The brochure also has a table of dimensions and specifications of models F-340 to F-4800. .....Item 101

VENTILATOR CATALOG—Power roof ventilators, for institutional, commercial, and industrial uses, are the subject of an 8-page catalog published by Roof Ventilator Div., Atmos Corp., Chicago, Ill. The catalog is a comprehensive selection guide of roof ventilators that are made in a variety of sizes and capacities. In addition to descriptions of the ventilators, the catalog gives factors, such as general ventilating requirements of various buildings, to be considered in the selection of roof ventilators. It also lists the performance data of different type ventilators with either direct or belt drives. .....Item 102

CENTRIFUGAL PUMP BULLETIN—Close-coupled centrifugal air conditioning pumps are described in a bulletin, 52B7529E, released by Allis-Chalmers Mfg. Co., Milwaukee, Wis. The bulletin carries dimensions for two models, fractional and integral horsepower, and 3500-rpm performance data curves. .....Item 103

HEAT EXCHANGER DATA—A catalog, No. 1155, of stainless steel heat exchangers is offered by Young Radiator Co., Racine, Wis. The catalog provides data on applying the exchangers for heating or cooling liquids and gases used in chemical, pharmaceutical, refining, and allied processing industries. Styles, sizes, dimensions, weights, and materials of their construction are given. A drawing of an exchanger illustrates its features. .....Item 104

PLUMBING FIXTURES PRICE BOOK—A 42-page price book of plumbing fixtures is published by Plumbing and Heating Div., American Radiator & Standard Sanitary Corp., New York, N. Y. The book lists the sizes, approximate shipping weights, and suggested consumer prices of cast iron enamel ware, vitreous chinaware, fittings, and water heaters. .....Item 105

LOW VELOCITY AIR MANUAL—A 71-page manual on low velocity air distribution systems, called Multi-Vent, is published by The Pyle-National Co., Chicago, Ill. The manual is enclosed in a flexible covered ring binder and is color-indexed for quick reference. It covers the subject from the basic principles to installation data for various types of ceilings. Illustrated with both photographs and diagrams, the manual is available by request on business letterheads. .....Item 106

DISCUSSION ON WATER HEATING—A bulletin is available from Portmar Boiler Co., Inc., Brooklyn, N. Y., which explains several advances in volume hot water heating. The bulletin shows the advantages of an indirect (tankless) hot water system and explains why a storage tank is not necessary, in many instances, to deliver large quantities of sanitary hot water. Also included in the bulletin are dimensions and capacities for 9 water heaters. .....Item 107

FAN ENGINEERING FILM—A 15-min sound film in color covering industrial axial flow fans is released by Aerovent Fan Co., Inc., Piqua, Ohio. The movie was filmed and produced in the company's engineering department and describes the three basic types of axial flow fans, their inherent characteristics, and the methods of testing employed in modern fan engineering laboratories. .....Item 108

CONDENSED CONTROLS CATALOG—A condensed catalog, Bulletin AL 3-1, of components of the Autronic control system is announced by The Swartwout Co., Cleveland, Ohio, manufacturer of process controls, power plant and industrial ventilation equipment. Printed in two colors and punched for insertion in standard three-ring binders, the four-page catalog illustrates and gives a brief description of the function and working principles of each unit in the system. .....Item 109

COOLING CONTROL BULLETIN—Supplement No. 1 to Bulletin No. 700-A, published by Sarco Co., Inc., New York, N. Y., describes a cooling control that holds the temperature of cooling water in jackets or coils of compressors, oil coolers, condensers, and stills. Typical hook-up sketches for the control are given in the supplement in addition to the control's capacities at various pressure drops and temperature changes. .....Item 110

ESTIMATING CATALOG—The 1951 spring and summer estimating catalog is announced by M. Eisner & Son, Passaic, N. J., wholesalers and manufacturers of heating, ventilating, refrigeration, and air conditioning equipment. The 36-page pricing guide covers over 90% of the items normally used by contractors and engineers. Tables in the catalog are prepared for the selection and pricing of blowers, fans, coils, evaporative condensers, valves, and fittings. .....Item 111

BRAZING MANUAL OFFERED—A 24-page brazing manual, No. 935, is available from Air Reduction Sales Co., New York, N. Y. The manual is concerned with the application of the major brazing methods in joining metals using silver alloys and filler metals, fluxes, and gas atmospheres. Over twenty tables, drawings and photographic illustrations are reproduced in the booklet. The subjects discussed include silver brazing procedure, selection of brazing and filler metals, design of brazed joints, pre-braze cleaning and assembly of brazed joints. .....Item 112

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READERS' SERVICE DEPT.

TEMPERATURE CONTROL BULLETIN—A bulletin, entitled Temperature Control Systems, is available to individuals interested in the application of automatic control to industrial process applications from Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill. An informative section will help in the selection of sensing elements and their correct use for the most satisfactory results. Control terminology, as well as rules to use as a guide for the selection of a proper method of control for process characteristics, is part of the bulletin, numbered P 6140-2. .....Item 113

INSULATING GLASS MANUAL—A technical manual on Thermopane insulating glass, revised to include data on glazing air-conditioned buildings, has been prepared by Libbey-Owens-Ford Glass Co., Toledo, Ohio. The 28-page book compares the effectiveness of single, double, and triple glazing in retarding winter heat loss and summer heat gain, their light and solar radiation transmittances, and surface condensation points. The newly added section on air-conditioned buildings outlines a formula for calculating solar heat gain through windows. Also included in the air-conditioning section are two pages devoted to building orientation and methods of shading windows exposed to direct solar radiation. .....Item 114

BULLETIN ON DRAFT GAGES—A 4-page bulletin No. 214, is issued by Ellison Draft Gage Co., Inc., Chicago, Ill., describing the company's three types of draft gages for use on heating, ventilating, and air conditioning ducts in which air filters are used. The three gages described are: an inclined tube type, a bell-actuated dial type, and a diaphragm-actuated dial type. Installation details of the gages are also given in the bulletin. .....Item 115

MOBILE AIR CONDITIONING—A four-page illustrated bulletin describing mobile air conditioning units designed primarily for military trailers available from Ellis & Watts Products, Inc., Cincinnati, Ohio. The bulletin contains detailed information on the applications and specifications of the units. .....Item 116

REPLACEMENT COIL CATALOG—A 12-page catalog, No. 55-61, of replacement copper coils for water heaters is published by Dormont Mfg. Co., Pittsburgh, Pa. In addition to water heater coils, the catalog lists range burner, gas conversion, furnace, and boiler stove coils. .....Item 117

AIR CONTROL CATALOG—A 24-page catalog illustrating its 2, 3, and 4-way air control valves for high-pressure or low-pressure installations is offered by Automatic Valve, Inc., Cleveland, Ohio. The following type valves are included: cam, flow control, foot, hand, interlocking, pilot, pressure regulator, quick exhaust, sequence, solenoid, and time delay. Also presented are single and double-acting cylinders for air or hydraulic use and strainers for pipeline protection. In the catalog, each type valve, cylinder and strainer is handled separately, and helpful information on its outstanding features, application data, dimensions, specifications, and parts-list breakdown is provided. .....Item 118

TECHNICAL PAPER AVAILABLE—Cooling Tower Wood Can Be Protected is the subject of Technical Paper No. 120, prepared by W. H. & L. D. Betz, Philadelphia, Pa. In recent years deterioration of cooling tower wood has been recognized as a problem of increasing importance in industry. This paper discusses how chemical and bacteriological attack can be controlled by acid treatment and wood preservatives to kill fungi. .....Item 119

ELECTRIC MOTOR DESCRIPTION—A description of a series of totally-enclosed and explosion-proof electric motors is contained in a bulletin issued by U. S. Electrical Motors, Inc., Los Angeles, Calif. A colored cross-section of the Type J motor points out the various design features of the motor. Photographs and drawings illustrate the motor's stator core, windings, and lubrication methods. .....Item 120

FIRE PREVENTION CATALOG—A catalog, designated as D, of fire prevention equipment, including hose racks, hose cabinets, Siamese connections, extinguishers, fire-line valves, and roof and line manifolds, is issued by Croker Fire Prevention Corp., New York, N. Y. Besides photo illustrations, the equipment is shown in mechanical drawings, with dimensions for product sizes stated in tabular form. The catalog includes an analysis of differences among the three common types of fire extinguishers: vaporizing-liquid, wet-chemical, and foam. .....Item 121

PUMPS USED ARE EXPLAINED—Prepared with the assistance of water treating and consulting firms, Bulletin 953, published by Milton Roy Co., Philadelphia, Pa., describes and illustrates how controlled volume pumps are used in typical industrial water treating systems. These water treating processes described include coagulation systems, lime soda softening, hot process softeners, demineralization, and various types of boiler water treatment systems. An analysis is given to cooling tower water treating problems as well as methods and systems for waste and sanitary water treatment in the 24-page bulletin. .....Item 122

COOLING CONTROLS CATALOG—A condensed cooling catalog for the refrigeration and air conditioning industry is offered by Penn Controls, Inc., Goshen, Ind. The catalog, designated Bulletin 1457-AA, illustrates and describes many of the cooling controls manufactured by the company as well as giving condensed information on specifications, application data, and the procedure for ordering any of the cooling controls. Included in the catalog for the first time is the Series 800 combination heating-cooling thermostat. The thermostat is available in seven different basic constructions for residential air conditioning systems. .....Item 123

VIEWS ON AIR CONDITIONING—Independent consulting engineers' views on air conditioning of television studios, office buildings, banks, motels and department stores are presented in an Architectural File Folder, available from Kinetic Chemicals Div., E. I. du Pont de Nemours & Co., Wilmington, Del. Issued annually since 1949 as an industry service, the folder contains comprehensive reports on air conditioning installations in specific types of buildings. The 1954 file includes discussions by five engineers and a separate discussion of proper location of air conditioning equipment by a sixth. .....Item 124

BULLETIN ON FLEXIBLE TUBING—Flexible Nylon pressure tubing, called Nylaflow, is described in a new product bulletin issued by The Polymer Corporation of Pennsylvania, Reading, Pa. Outlined uses of the tubing listed by the bulletin include air lines, process lines, coolant lines, fuel and oil lines, lubricant lines and hydraulic lines. Complete information is provided on the material's advantages, characteristics and properties. Important cost and installation data round out the product description. Illustrations accompany the engineering information throughout. Sizes and lengths of available tubing are also given. .....Item 125

CAST IRON ITEMS ARE CATALOGED—A catalog of malleable and cast iron items is published by Jamaica Mfg. Co., Inc., Brooklyn, N. Y. The catalog shows the variety of elbows, tees, plugs, couplings, flanges, unions, bushings, and specialties made by the company. .....Item 126

OIL SEPARATORS ARE DESCRIBED—Oil separators for refrigerating and air conditioning applications are described in a brochure issued by Temprite Products Corp., Birmingham, Mich. A colored flow diagram in the brochure illustrates the operation of the separators, and charts list their specifications and dimensions for use with methyl chloride and Freon refrigerants. .....Item 127

DATA ON STEEL VALVES—A 12-page technical data booklet, covering stainless steel valve design, selection, maintenance, and repair is announced by Cooper Alloy Corp., Hillside, N. J. Printed to form part of a forthcoming new catalog, the technical section is being offered separately on request. Photographs, engineering drawings and cut-away views are used in a discussion of the valves. .....Item 128

PLEASE SEND US MORE INFORMATION. Circle below item numbers on which you wish further information.

1	11	21	31	41	51	61	71	81	91	101
2	12	22	32	42	52	62	72	82	92	102
3	13	23	33	43	53	63	73	83	93	103
4	14	24	34	44	54	64	74	84	94	104
5	15	25	35	45	55	65	75	85	95	105
6	16	26	36	46	56	66	76	86	96	106
7	17	27	37	47	57	67	77	87	97	107
8	18	28	38	48	58	68	78	88	98	108
9	19	29	39	49	59	69	79	89	99	109
0	20	30	40	50	60	70		90	100	110

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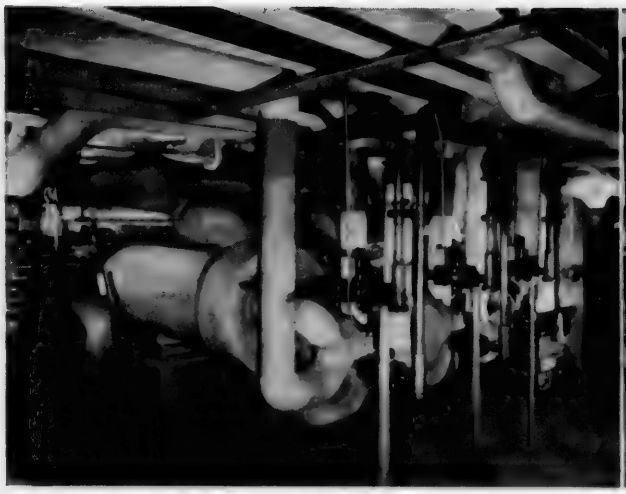
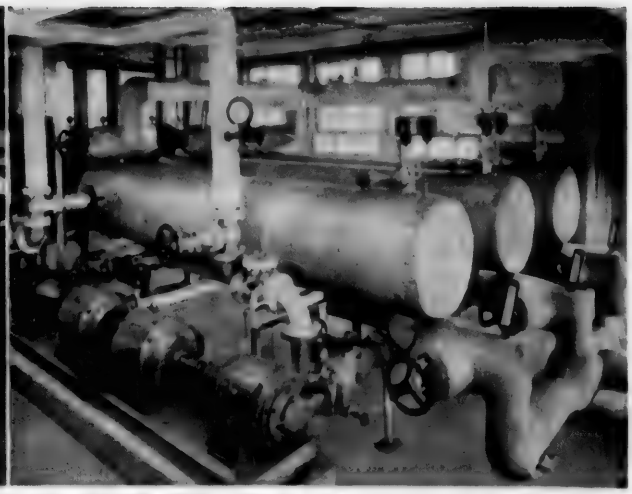


These three p-k Freon coolers, located in the basement, protrude through brick wall to save space.



Fifth floor installation shown here conditions upper floors. Third floor chillers serve cooling tunnels.

for perfect candy kitchen weather

LOFT'S USES p-k COOLERS

Schwerin Air Conditioning Corp. specified Chrysler Airtemp Units with p-k chillers to keep Loft's 8-story Long Island candy kitchen at just the right temperature and humidity for candy perfection.

You've seen soft, sticky, unappetizing candy you wouldn't want to eat. But you won't see it at Loft's. This big Eastern candy manufacturer has an unusual ability for maintaining the highest standards of quality 'buy-appeal'. And one important reason is its thorough-going air conditioning system employing Chrysler Airtemp units and six p-k dry expansion Freon coolers, engineered and installed by Schwerin Air Conditioning Corp., New York.

At Loft's both humidity and temperature must be rigidly controlled, for when humidity gets out of hand, candy is unsaleable.

So the reheating principle is used to cool the air, and "wring" it to the proper humidity. "Two-circuit" type p-k Freon coolers which chill a glycol solution are located in the basement and the third and fifth floors, to serve nearby areas. Air from conditioned areas passes around coils chilled by the glycol solution and air temperature is reduced some 25°F. to 43°F. A water spray cleans the air, and increases its humidity to 97%. Then the air is circulated around heating coils where its temperature is raised to 60°F. and humidity reduced to 51%—just the right "weather" for perfect candy-making.

The six p-k Freon coolers are automatically controlled; operation is simple. Because the coolers are enclosed, the Loft system is a *clean* system. Compact p-k Freon coolers require minimum floor space, minimum insulation.

If you, like Loft's, have a tough "indoor weather" problem, p-k heat exchange specialists would be glad to assist. More than likely they'll have answers to your particular questions. Write today for illustrated literature and engineering suggestions.

The Patterson-Kelley Co., Inc., 970 Burson Street, East Stroudsburg, Pa.

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2569

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DEGREE-DAYS FOR MAY, 1955

(A) Airport readings; (C) City office readings; (O) Readings at a point on outskirts of city.

AIR CONDITIONING, HEATING AND VENTILATING's 27th Year of Publication of Monthly Degree-Day Data

City	May			Season to May 31, incl.*		
	1955	1954	Normal	1954-55	1953-54	Normal
Abilene, Texas (A)	0	63	0	2265	2344	2707
Albany, New York (A)	155	301	246	6477	6313	6888
Albuquerque, New Mexico (A)	90	59	70	4247	3785	4389
Alpena, Michigan (C)	322	498	437	7290	7268	7803
Anaconda, Montana (C)	(a)	428	517**	(a)	7023	7493**
Asheville, North Carolina (C)	32	238	105	4063	3910	4067
Atlanta, Georgia (A)	0	105	20	2751	3588	2826
Atlantic City, New Jersey (C)	160	201	468	4634	4239	4717
Augusta, Georgia (A)	1	66	0	2537	2357	2138
Baltimore, Maryland (C)	38	112	73	4032	3636	4203
Billings, Montana (A)	320	356	304	6790	6393	6959
Binghamton, New York (C)	183	295	240	6144	5999	6472
Birmingham, Alabama (A)	2	95	30	2686	2638	2788
Bismarck, North Dakota (A)	211	420	355	8065	8022	8851
Block Island, Rhode Island (A)	281	346	335	5442	5090	5720
Boise, Idaho (A)	353	203	249	6466	5115	5798
Boston, Massachusetts (A)	133	287	236	5395	5124	5742
Bozeman, Montana (C)	(a)	422	471**	(a)	7039	8195**
Buffalo, New York (A)	206	335	315	6150	6043	6720
Burlington, Iowa (A)	106	261	179	5669	5490	6067
Burlington, Vermont (A)	(a)	320	307	(a)	7109	7727
Butte, Montana (C)	(a)	415	502**	(a)	7257	7926**
Cairo, Illinois (C)	2	103	47	3533	3494	3756
Charleston, South Carolina (C)	0	5	0	1822	1591	1769
Charlotte, North Carolina (A)	0	118	29	3081	3015	3205
Chattanooga, Tennessee (A)	6	132	45	3276	3195	3384
Cheyenne, Wyoming (A)	359	444	462	6349	6410	7317
Chicago, Illinois (C)	139	305	254**	5396	5271	6018**
Cincinnati, Ohio (C)	36	184	108	4105	4030	4532
Cleveland, Ohio (A)	126	263	223	5379	5313	5950
Columbia, Missouri (A)	54	189	135	4521	4436	5093
Columbia, South Carolina (A)	1	51	0	2605	2119	2284
Columbus, Ohio (C)	74	258	153	4865	4500	5255
Concord, New Hampshire (A)	216	345	316	6911	6678	7462
Concordia, Kansas (C)	26	201	146	4895	4744	5303
Dallas, Texas (A)	0	55	0	2146	2166	2272
Dayton, Ohio (A)	91	267	179	5211	4822	5552
Deer Lodge, Montana (C)	(a)	445	487**	(a)	7117	8347**
Denver, Colorado (A)	203	256	286	5758	5032	6051
Des Moines, Iowa (A)	80	274	201	5962	5842	6384
Detroit, Michigan (A)	154	313	251	5793	5761	6336
Devils Lake, North Dakota (C)	303	503	394	9106	9012	9695
Dodge City, Kansas (A)	54	221	135	4586	4549	5043
Dubuque, Iowa (A)	160	354	267	6760	6556	7159
Duluth, Minnesota (C)	416	637	487	9007	8936	9217
Elkins, West Virginia (A)	179	354	224	5675	5600	5680
El Paso, Texas (A)	2	13	0	2523	2434	2641
Ely, Nevada (A)	525	331	418	8016	6751	7177
Escanaba, Michigan (C)	352	562	471	7650	7653	8334
Evansville, Indiana (A)	38	189	90	4264	4225	4354
Fargo, North Dakota (A)	195	456	338	8643	8564	9107
Fort Smith, Arkansas (A)	0	101	24	3096	3181	3188
Fort Wayne, Indiana (A)	131	299	226	5652	5543	6217
Fort Worth, Texas (A)	0	57	5	2193	2252	2361
Fresno, California (A)	87	15	43	3039	2502	2532
Galveston, Texas (C)	0	9	0	990	1024	1211
Grand Junction, Colorado (A)	163	97	145	6145	4930	5773
Grand Rapids, Michigan (A)	197	363	301	6309	6229	6948
Green Bay, Wisconsin (A)	267	468	347	7658	7304	8062
Greensboro, North Carolina (A)	20	174	50	3785	3628	3810
Greenville, South Carolina (A)	9	109	32	3101	2854	3060
Harrisburg, Pennsylvania (A)	80	194	128	5019	4810	5244
Hartford, Connecticut (A)	129	251	201	5783	5439	6094
Hatteras, North Carolina (C)	27	34	25	2523	1958	2392
Havre, Montana (C)	370	341	313	7643	7529	8030
Helena, Montana (A)	480	386	399	8255	7071	8005
Houston, Texas (C)	0	13	0	1134	1121	1276
Huron, South Dakota (A)	117	401	279	7248	7355	7796
Indianapolis, Indiana (A)	101	250	176	5219	5012	5581
Jackson, Mississippi (A)	0	70	0	2233	2151	2202
Kansas City, Missouri (A)	36	153	111	4330	4260	4880
Knoxville, Tennessee (A)	8	162	50	3521	3439	3590
La Crosse, Wisconsin (A)	133	354	250	7039	6665	7545

(a) Data not available.

*Heating season, cumulative, from Sept. 1.

**Same normal figures as previously listed by HEATING AND VENTILATING since new figures are not available. All other normal figures in this table are based on a 30-year period covering 1921 to 1950, inclusive, recently compiled and published by the U. S. Weather Bureau.

Figures in this table, with eight exceptions, based on local weather bureau reports. Exceptions are Utica and Lewiston, figures for which are furnished through the courtesy of Coke Sales Department, Central New York Power Corp., Utica, N. Y., and Norman E. Ross, Bursar, Bates College, Lewiston, Me., respectively; Anaconda, Bozeman, Butte, Deer Lodge and Livingston, Mont., through the courtesy of the Montana Power Company. Tacoma figures through the courtesy of the Tacoma News Tribune.

[Table concluded on page 134]

Simplicity and Good Design Features in

POWERS

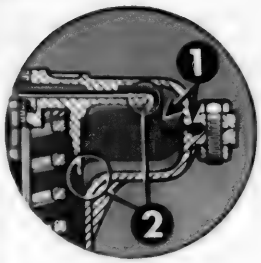
FLOWRITE VALVES

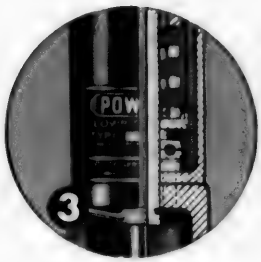
STURDY, PRACTICAL DESIGN
Strong, light weight precision cast alloy housing is corrosion resistant. Only 6 bolts saves maintenance time.

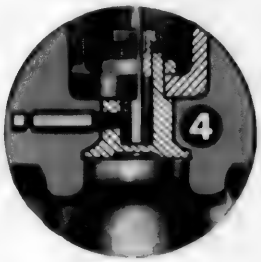
OVER 60 YEARS
of Temperature and Humidity Control.

Ball Check Lubricator with Silicone grease for temperatures 40° to 500° F.

(108)







give close control and they last longer

1 Diaphragm has a formed bead which provides increased sealing action with increasing control pressure. It has no bolt holes. Diaphragm lasts longer.

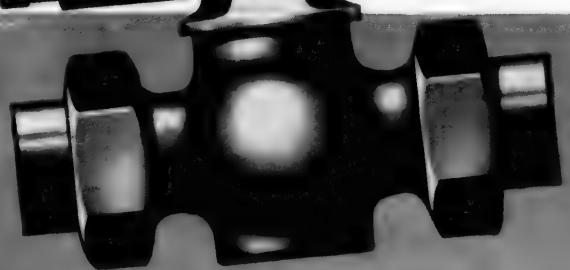
2 Piston plate assembly has a free floating thrust plate which absorbs side thrust. Closely guided piston plate maintains valve stem in accurate alignment. High tensile strength steel spring is cadmium plated and completely enclosed.

3 Adjustment screw is non-rising ball bearing type cadmium plated, easily accessible, easy to adjust.

4 Packing: Deep packing space contains preformed lubricated packing readily accessible. Note lubricator.

Accurate control results from smooth rolling diaphragm and minimum of valve stem friction.

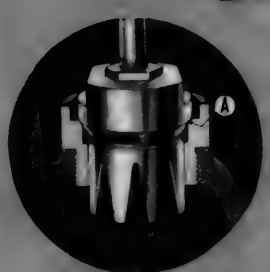
Right type and size of valve is important for good control. An experienced Powers engineer will gladly help you make the right selection. Call our nearest office or write us direct.



For Pressures up to 250 PSI.

AT NO EXTRA COST
POWERS CONTROL SYSTEMS
Include these Premium Quality Valves

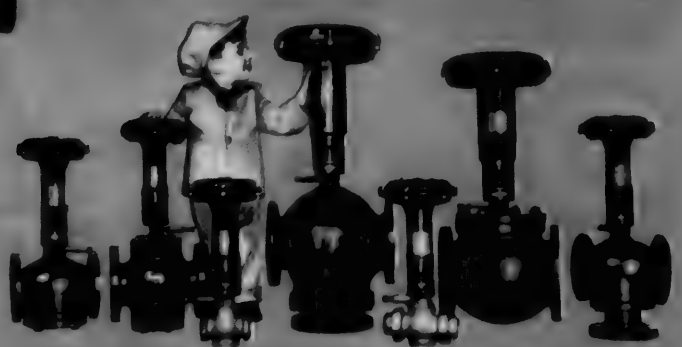
Get complete information, write for series 344 bulletins



Renewable Stainless Steel, Disc and Seat.

Compare POWERS Single Seat Valves with other high quality valves. Check their performance, tight shut off feature and sturdy construction.

Available: Composition Disc also V-Port characterized which gives straight line control. Separate shut off seat (A) reduces wire drawing, insures tight shut off.



SINGLE SEAT • DOUBLE SEAT • 3-WAY MIXING VALVES

Established 1891 **THE POWERS REGULATOR COMPANY** Skokie, Illinois

Offices in Chief Cities in U.S.A., Canada and Mexico, See Your Phone Book

Degree-Days for May, 1955 (Concluded)

(A) Airport readings; (C) City office readings; (O) Readings at a point on outskirts of city.

AIR CONDITIONING, HEATING AND VENTILATING's 27th Year of Publication of Monthly Degree-Day Data

City	May			Season to May 31, incl.*		
	1955	1954	Normal	1954-55	1953-54	Normal
Lander, Wyoming (A)	319	368	396	7546	6704	8110
Lewiston, Maine (O)	217	405	344**	6973	7065	7662**
Lincoln, Nebraska (C)	45	245	172	5429	5334	5826
Little Rock, Arkansas (A)	0	66	18	2846	2800	2982
Livingston, Montana (C)	(a)	434	405**	(a)	6734	7043**
Los Angeles, California (C)	88	47	68	1250	1102	1432
Louisville, Kentucky (A)	32	188	94	4148	4094	4434
Lynchburg, Virginia (A)	50	201	82	4106	3916	4148
Macon, Georgia (A)	0	48	0	2158	2032	2049
Madison, Wisconsin (C)	159	370	266	6730	6454	7181
Marquette, Michigan (C)	351	631	477	7645	7641	8184
Memphis, Tennessee (A)	0	81	24	3028	2915	3137
Meridian, Mississippi (A)	0	77	9	2371	2303	2333
Milwaukee, Wisconsin (A)	229	415	351	6490	6362	7044
Minneapolis, Minnesota (A)	124	369	259	7409	7193	7748
Moline, Illinois (A)	100	291	199	5946	5778	6311
Montgomery, Alabama (A)	0	35	0	2218	2061	2137
Nantucket, Massachusetts (A)	(a)	398	394	(a)	4521	5907
Nashville, Tennessee (A)	5	152	43	3519	3436	3513
New Haven, Connecticut (A)	180	298	261	5578	5413	5956
New Orleans, Louisiana (C)	0	8	0	1116	1087	1175
New York, New York (C)	100	198	153	4824	4422	5032
Newark, New Jersey (A)	79	192	148	4864	4633	5241
Norfolk, Virginia (A)	58	112	59	3417	3108	3454
North Platte, Nebraska (A)	140	341	243	6470	6107	6470
Oak Ridge, Tennessee	14	189	(a)	3806	3696	(a)
Oakland, California (A)	232	180	212	3117	2578	2883
Oklahoma City, Oklahoma (A)	5	132	38	3387	3281	3519
Omaha, Nebraska (A)	55	235	175	5582	5412	6123
Parkersburg, West Virginia (C)	63	107	119	4611	4385	4737
Peoria, Illinois (A)	90	247	192	5509	5378	6035
Philadelphia, Pennsylvania (C)	50	145	93	4354	4041	4523
Phoenix, Arizona (A)	3	4	0	1436	1357	1492
Pittsburgh, Pennsylvania (C)	88	220	137	4717	4552	5035
Pocatello, Idaho (A)	403	249	317	7745	5973	6840
Portland, Maine (A)	289	419	394	6987	6928	7493
Portland, Oregon (C)	316	203	199	4361	3844	4046
Providence, Rhode Island (A)	185	297	258	5633	5460	6041
Pueblo, Colorado (A)	138	194	203	5296	4689	5682
Raleigh, North Carolina (A)	17	144	29	3389	3002	3075
Rapid City, South Dakota (A)	203	349	357	6655	6271	7331
Reading, Pennsylvania (C)	62	172	123	4773	4518	5044
Red Bluff, California (A)	53	13	51	3023	2415	2546
Reno, Nevada (A)	355	201	318	6413	5293	5783
Richmond, Virginia (A)	67	151	66	3872	3629	3955
Rochester, New York (A)	205	330	289	6352	6197	6766
Roswell, New Mexico (A)	16	47	28	3397	3176	3424
Sacramento, California (C)	79	27	85	2942	2382	2595
St. Joseph, Missouri (A)	50	204	101	5051	4869	4692
St. Louis, Missouri (C)	20	156	94	4107	3920	4462
Salt Lake City, Utah (A)	257	163	233	6389	5040	5785
San Antonio, Texas (A)	0	10	0	1227	1380	1579
San Diego, California (A)	103	57	97	1326	1160	1513
Sandusky, Ohio (C)	129	268	217	5302	5131	5818
San Francisco, California (C)	261	264	248	2749	2360	2523
Sault Ste. Marie, Michigan (A)	376	612	499	8365	8447	9016
Savannah, Georgia (A)	0	23	0	2020	1716	1710
Scranton, Pennsylvania (A)	170	255	196	5781	5473	5994
Seattle, Washington (C)	363	247	246	4486	4152	4237
Sheridan, Wyoming (A)	342	394	387	7346	6764	7674
Shreveport, Louisiana (A)	0	47	0	2042	2056	2117
Sioux City, Iowa (A)	61	284	228	6237	6273	6933
Spokane, Washington (A)	478	299	330	7017	6151	6661
Springfield, Illinois (A)	75	219	127	5070	4660	5211
Springfield, Missouri (A)	28	184	118	4245	4131	4669
Syracuse, New York (A)	193	290	247	6354	6090	6454
Tacoma, Washington (C)	322	247	282	4609	4191	4595
Toledo, Ohio (A)	145	317	245	5739	5677	6322
Topeka, Kansas (C)	36	165	112	4566	4365	4906
Trenton, New Jersey (C)	79	192	133	4819	4524	5057
Utica, New York (O)	215	312	253**	6808	6529	6796**
Valentine, Nebraska (C)	144	344	288	6549	6195	6971
Walla Walla, Washington (C)	281	155	171	5053	4344	4810
Washington, D. C. (C)	34	132	80	4047	3777	4258
Wichita, Kansas (A)	14	156	101	4203	4145	4564
Williston, North Dakota (C)	297	432	360	8173	8180	8859
Winnemucca, Nevada (A)	402	238	299	7188	5711	6241
Yakima, Washington (A)	(a)	229	205	(a)	5554	5785

For footnotes, see page 132.

One of a series appearing in **FORTUNE, TIME, NEWSWEEK, BUSINESS WEEK** *and leading architectural magazines.*

discipline

We discipline copper.

We put it through the roaring heat of our own smelter . . . the high-amp stillness of electrolytic refining tanks . . . the irresistible pressures of piercing mills and extrusion presses . . . the long reaches of our drawbenches . . . through coiling, annealing, straightening and testing equipment.

We work our will on copper—through every chemical change, every physical gyration known or needed—to deliver it perfect and enduring, yet submissive . . . as Lewin-Mathes seamless tube, pipe and fittings.

Like the ancient coppersmith, our pride of product is that of the *integrated specialist.* And the Lewin-Mathes nation-wide supply facilities serving you, we believe, are second to none.

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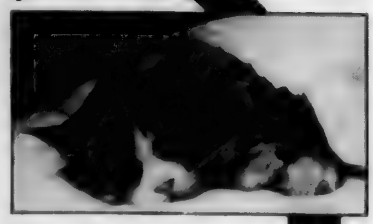
COPPER AND BRASS TUBE, PIPE, ROD AND FITTINGS

Install kitten-quiet
VENTILATION



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DOMEX

Low velocities and low rotational speeds are combined in the Domex to provide the hushed air movement so necessary in modern building ventilation.

V-Belt driven centrifugal fans in attractive and ageless spun aluminum housings permit capacity selections from 400 to 4000 cfm. This also permits standardization of roof openings and provides a uniformity of appearance and height for all roof mounted fans through this wide range of capacities.

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Member of the Power Fan Manufacturers Association

FOR MORE THAN 25 YEARS THE BUILDERS' TOP LINE

Canadian Degree Days for May, 1955*

City	May		Cumulative	
	1955	Normal	1954	Normal
Calgary, Alta.	616	480	8804	9111
Charlottestown, P. E. I.	543	536	7764	8263
Crescent Valley, B. C.	515	403	7897	7731
Edmonton, Alta.	468	428	9196	9797
Fort William, Ont.	453	567	9754	10045
Grande Prairie, Alta.	558	505	9973	10122
Halifax, N. S.	479	493	6693	7395
London, Ont.	234	307	6873	7275
Medicine Hat, Alta.	459	301	8209	8495
Moncton, N. B.	535	474	8048	8568
Montreal, P. Q.	193	325	7930	8413
North Bay, Ont.	362	434	9090	9180
Ottawa, Ont.	228	310	8240	8674
Penticton, B. C.	409	273	6637	6346
Porquis Junction, Ont.	429	558	10573	11144
Prince George, B. C.	642	490	9028	8996
Quebec City, P. Q.	372	428	8860	9276
Regina, Sask.	443	434	9892	10891
St. John, N. B.	493	505	7808	8081
Saskatoon, Sask.	437	397	10057	10478
Toronto, Ont.	195	341	6316	7236
Vancouver, B. C.	431	326	5432	5303
Victoria, B. C.	497	366	5364	4935
Windsor, Ont.	172	251	6026	6705
Winnipeg, Man.	320	397	9927	10841

*These data are supplied through the courtesy of the Meteorological Division Air Service Branch, Department of Transport, Canada.
The Department reports slight revisions in the figures for April as published in last month's issue. Corrected figures are: Edmonton, Alta., 825; Victoria, B. C., 618.

BOOK REVIEWS

(*Continued from page* 109)

AIRBORNE CONTAGION AND AIR HYGIENE

For the past seventeen years, at the Laboratory for the Study of Airborne Infection, University of Pennsylvania School of Medicine, and earlier at Harvard University for five years, William Firth Wells has been carrying studies in the field of airborne contagion.

Results of these and other studies are the basis of the book, Airborne Contagion and Air Hygiene, by William Firth Wells. Basically, the book consists of two sections —part one dealing with airborne contagion and part two on air hygiene. Part one covers the physics and physical chemistry of droplets and droplet nuclei, and also the biology, biophysics and biochemistry of droplet nuclei infection. The second part has chapters on sanitary ventilation, threshold sanitation, air hygiene, dust-borne infection, and the ecology of droplet infections.

It is felt that the real significance of sanitary ventilation in the dynamic control of contagious disease is not yet fully understood. Data presented by the author should prove of considerable value.

Airborne Contagion and Air Hygiene, by W. F. Wells. Cloth bound, 6 x 9 inches, 423 pages. Published by Harvard University Press, Cambridge, Mass. Price, $6.

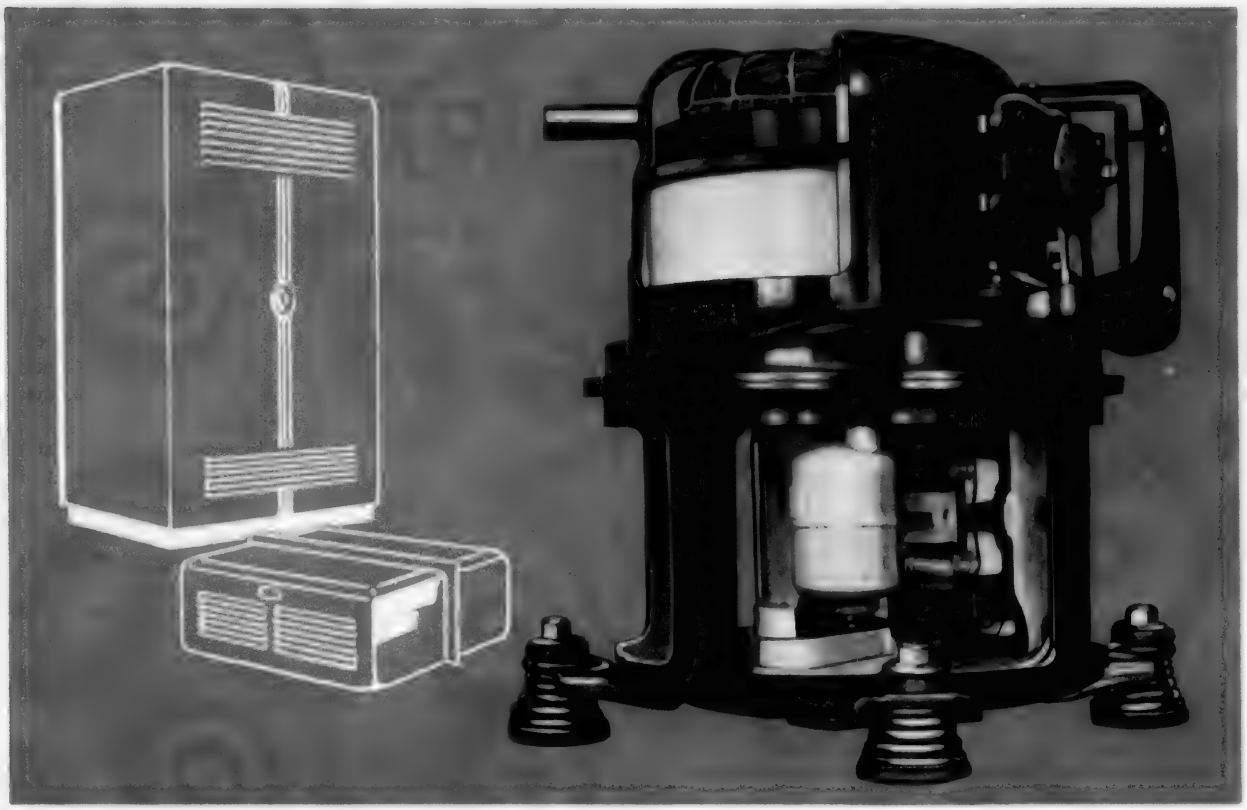
TRANSACTIONS OF INDUSTRIAL HYGIENE FOUNDATION

Transactions of the various conferences and the general meeting of the Industrial Hygiene Foundation of America held in Pittsburgh, Pa., November 17-18, 1954, are con-

(*Concluded on page* 138)

WHISPER-QUIET **POWER**

for package Air Conditioning



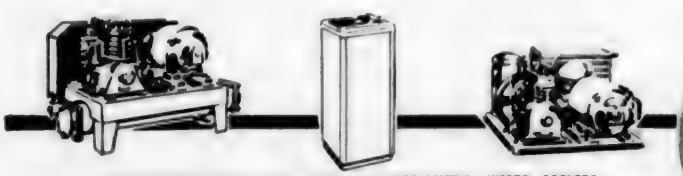
COPELAWELD *HERMETIC*

It takes real engineering (and knowledge of your customers' needs) to produce a welded motor-compressor that combines positive performance, vibration-free smoothness, and maximum operating economy.

Copeland gives you these design advantages and more . . . plus precision manufacture using finest components. Heavy-duty, high-power-factor motor delivers power aplenty with minimum current consumption. Freon-12 and Freon-22 models available. Use of Freon-12 can give you as much as 75° F. lower temperatures in windings, crankcase, oil and discharge side. Unusually high capacities make Copelaweld motor-compressors adaptable to virtually every type of duty.

Power all your air conditioning and refrigeration equipment with Copeland motor-compressors. It's *the* quality equipment that enhances your reputation by its long-run, trouble-free service.

Get full details . . . write today for complete information on the profit-making Copeland line.



REFRIGERATION UNITS (OPEN TYPE AND COPELAMETIC) WATER COOLERS

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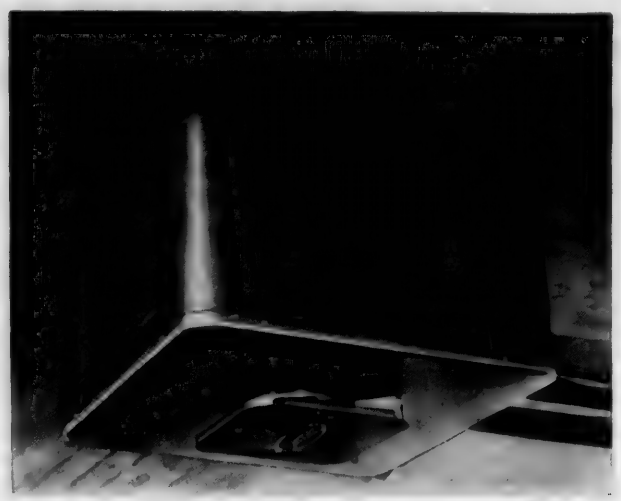
COPELAND REFRIGERATION CORPORATION · SIDNEY, OHIO

Carrier knows heating

Carrier has fifty years of experience in "making" and controlling temperatures. Today Carrier offers a choice of steam and hot water unit heaters in various types and a wide range of sizes. All are of highly advanced design for the efficient distribution of heat in factories, warehouses, display rooms and the like.



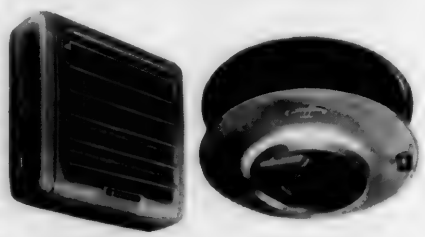
The Carrier 4-way Directed-flo Unit Heater

is the answer to the problem of heating large spaces. In contrast to conventional types of unit heaters, the directional-flo unit will heat three times the same area more economically and at a lower initial cost. Fewer heating elements are required. Less piping, valves and fittings are needed. The 4-way delivers quick heat downward from any or all four sides . . . as much or as little as wanted. Eight sizes—82,000 to 590,000 Btu/hr.

WRITE or USE COUPON for complete information

CARRIER Horizontal Air Discharge Unit Heater is powerful, smartly styled and quiet in operation. For retail shops, restaurants, garages, offices. Sizes 21,000 to 200,000 Btu/hr.

CARRIER Projection Type Unit Heater gives very efficient down-blow heat distribution, even from high ceiling installation. Choice of standard or low temperature rise coils. 30,000 to 576,000 Btu/hr.



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CARRIER CORPORATION, 304 S. Geddes St., Syracuse, New York
Send folders on features and selection data of Carrier Steam and Hot Water Unit Heaters.

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Business _____

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(*Concluded from page* 136)

tained in Transactions Bulletin No. 28. During this annual meeting the following conferences were held: Medical, legal, medical-legal, chemical-toxicological, engineering.

Transactions Bulletin No. 28. Paper bound, 6 x 9 in., 246 pages. Published by Industrial Hygiene Foundation of America, 4400 Fifth Ave., Pittsburgh 13, Pa. Price, $5.

CHANGES TO STANDARDS OF TUBULAR EXCHANGER MANUFACTURERS ASSOCIATION—All changes and additions made to the standards of the Tubular Exchanger Manufacturers Association are contained in a special bulletin, 1954 Addenda. Tubular Exchanger Manufacturers Association, 53 Park Pl., New York 7, N. Y.

WHAT READERS SAY

High Temperature Psychrometry

EDITOR, AIR CONDITIONING, HEATING AND VENTILATING

Referring to your May, 1955 issue, in the article entitled "High Temperature Psychrometric Chart for Humid Air," the solution of the example on Page 88, I believe, contains a serious error.

In the calculations of the specific volume of the water vapor contained in the leaving air-vapor mixture it is assumed that the pressure of this vapor is atmospheric pressure, 14.7 psi. Since the total pressure of this mixture is atmospheric pressure, the partial pressure of the water vapor is very much less.

Assuming each pound of dry air carries .202 lb of water vapor as given in the problem and that the constitutents of this mixture behave as perfect gases, the specific volume of the water vapor is readily calculated at 174 cu ft per lb.

This of course will affect the succeeding calculations of the problem.

H. L. Nachman
H. S. Nachman & Associates

Chicago, Ill.

Author's Reply

EDITOR, AIR CONDITIONING, HEATING AND VENTILATING

With reference to my article that appeared in the May issue of your publication, there was a printing error in equation 7 on page 88. In the article, you have shown V_2 equal to existing humid volume and V_1 equal to new humid volume. These should be reversed.

In reply to Mr. Nachman's letter of May 10, the second paragraph of his letter is absolutely correct, but the remainder is incorrect. It was not intended in the article to imply that the true specific volumes of the water vapor and dry air leaving the dryer were 42.8 cu ft per pound and 26.7 cu ft per pound respectively. The important consideration was to determine by the simplest method the pounds of dry air being exhausted and subsequently the specific humidity.

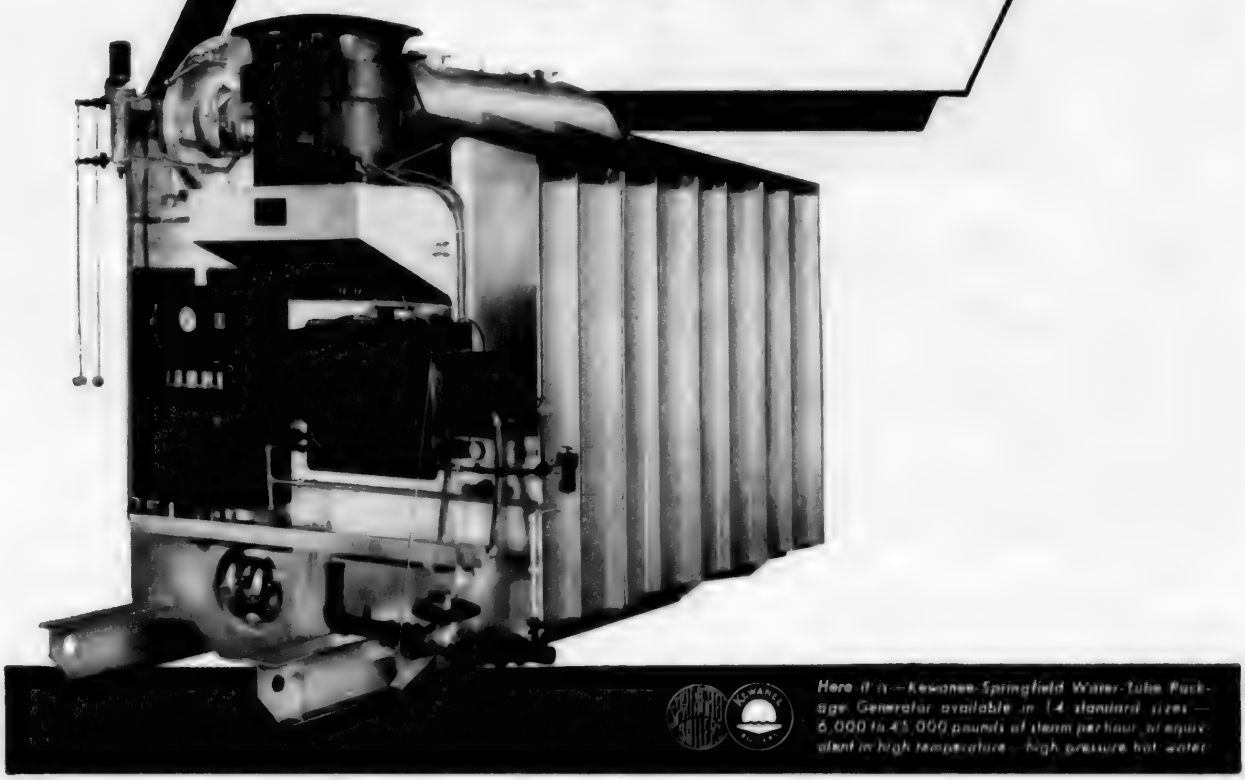
Without ignoring Dalton's law regarding the summation of the partial pressure of each constituent of a mixture, it is perfectly permissible and much simpler to increase each partial pressure to atmospheric pressure and use Amagat's law of additive volumes. This allows

(*Concluded on page* 140)

Announcing one of the most significant additions to our product line . . .

KEWANEE - SPRINGFIELD

water-tube package generator



Here it is—Kewanee-Springfield Water-Tube Package Generator available in 14 standard sizes—6,000 to 45,000 pounds of steam per hour or equivalent in high temperature—high pressure hot water.

Now from one source Kewanee offers you the broadest selection of boilers in the U.S.A.

When a new member is added to the family of products at Kewanee you may be sure much thought preceded such a move . . . thought of how you could better be served.

So with years of research and practical field experience behind us, we present the Kewanee-Springfield Water-Tube Package Generator. Manufactured by the Springfield Boiler Company and marketed coast-to-coast by Kewanee, it means from 1 source Kewanee now brings you the broadest selection of boilers in the U.S.A.

The Kewanee-Springfield Water-Tube Package Generator is the most compact power plant type unit. Specially selected, durable materials plus 2 drum bent tube design makes for maximum use of boiler space to deliver the greatest steam output. Steel encased—a complete unit with no extras required. Exclusive "6 wall" cooling permits high heat release rates.

All this adds up to lower operating cost . . . less fuel is required to deliver heat due to smaller heating surface with higher heat absorption. Maintenance cost is lower, too . . . double panel casing construction makes tubes easily accessible. Guaranteed maximum continuous capacity . . . can operate at peak loads without interruption.

KEWANEE-ROSS CORPORATION, Kewanee, Illinois

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BURT MONOVENT

Continuous Ridge Ventilator Is Your BEST Buy

Where high heat or fumes require the removal of large volumes of air, Burt Monovent exhausts more air per dollar than any other ventilator. It provides uniform ventilation of the entire structure—in effect, converts the roof ridge to a quick-acting giant air valve. The Monovent is economical to install, operate and maintain and highly efficient.

- *INSTALLS ON ANY TYPE ROOF*
- *SIZES FROM 4" TO 96"*
- *STURDY CONSTRUCTION FOR LONG LIFE*
- *MINIMUM MAINTENANCE*

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Write for Burt Data Book SPV-101-E. It supplies quick data on Burt's complete line of modern Roof Ventilators.

FAN & GRAVITY VENTILATORS • LOUVERS • SHEET METAL SPECIALTIES

The Burt Manufacturing Company

49 E. South Street, Akron 11, Ohio

Member Power Fan Manufacturers Association

What Readers Say

(*Concluded from page* 138)

the use of psychrometric tables instead of arithmetic computation to arrive at the final answer.

To illustrate, the same initial phase of the example problem will be worked using the perfect gas law and partial pressures, yet arriving at the same final result. Let:

P = atmospheric pressure = 2116.3 lb per sq ft
P_a = partial pressure of dry air
P_w = partial pressure of water vapor
V_m = volume of mixture = 35,000 cfm
W_a = weight of dry air
W_w = weight of water vapor = 200 lb per minute
B_a = gas constant for air = $\frac{1545}{29}$
B_w = gas constant for water vapor = $\frac{1545}{18}$
T = absolute temperature = 460 + 600 = 1060 deg

From the perfect gas law

$$PV = WBT$$

Therefore,

$$P_wV_m = W_wB_wT$$

Substituting

$$P_w \times 35{,}000 = 200 \times \frac{1545}{18} \times 1060$$

P_m = 520 lb per sq ft = partial pressure of water vapor

Dalton's law states:

$$P = P_a + P_w$$

Therefore, to find partial pressure of the dry air

$$P_a = P - P_w$$
$$= 2116.3 - 520$$
$$= 1596.3 \text{ lb per sq ft}$$

Using

$$P_aV_m = W_aB_aT$$

Substituting

$$1596.3 \times 35{,}000 = W_a \times \frac{1545}{29} \times 1060$$

W_a = 989 lb per minute = weight of dry air in gas stream

This agrees with line 6 of the example problem.

Referring to equation (1-4) of "Air Conditioning Analysis" by Goodman, the specific humidty is equal to

$$w = 0.622 \frac{P_w}{P - P_w}$$
$$= 0.622 \times \frac{520}{2116.3 - 520}$$
$$= .203 \text{ lb of water vapor per pound of dry air}$$

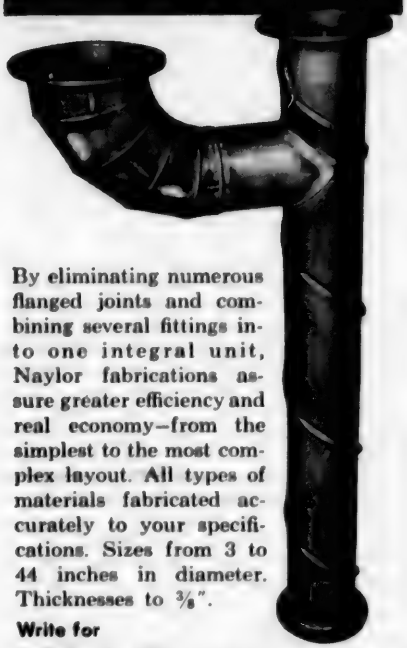
This is in agreement with line 7 of the example problem.

Actually the true specific volume of the water vapor would be obtained by dividing the volume of 35,000 cfm by the pounds of vapor, 200 pounds per minute, which gives 175 cu ft per pound. It is not necessary to know this value, if the problem is solved as shown in the article.

James R. Kayse
American Air Filter Company, Inc.
Louisville, Ky.

Cut Piping Layout Costs

NAYLOR FABRICATION SERVICE Can Save You Time, Material and Labor



By eliminating numerous flanged joints and combining several fittings into one integral unit, Naylor fabrications assure greater efficiency and real economy—from the simplest to the most complex layout. All types of materials fabricated accurately to your specifications. Sizes from 3 to 44 inches in diameter. Thicknesses to ⅜".

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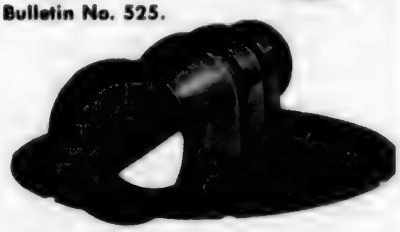

NAYLOR PIPE

Naylor Pipe Company
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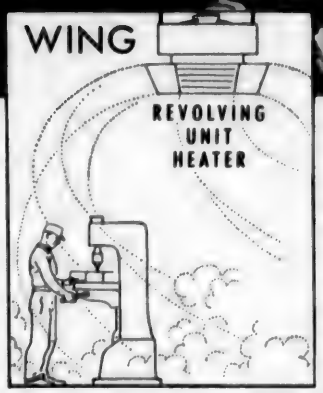

P.S. In the Summertime with the steam off, the revolving discharge outlets produce a pleasant cooling effect . . .

The fact that the discharge outlets of the Wing Revolving Heater keep the heated air in constant gentle motion, with no steady sickening blasts of hot air on the workers, is one reason why so many firms are adopting Wing Revolving Heaters as "morale boosters". Employees in these plants work in pleasant, comfortably warmed surroundings, and being comfortable they are more productive.

Shouldn't *you* learn more about Wing Revolving Heaters? Just use the coupon.

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L. J. Wing Mfg. Co., Linden, N. J. AC-7
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Name.....
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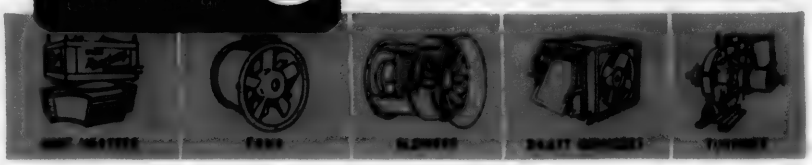
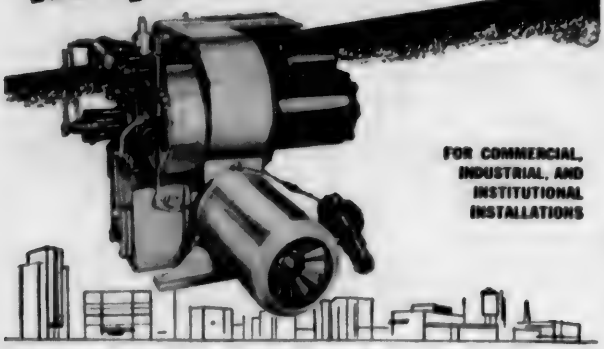


Hev-E-Oil Burner keeps heat cheap!



FOR COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL INSTALLATIONS

Use heavy fuel oils *costing 30% less per gallon*

Cheap heat is smart economy! That's why thousands of owners are converting to Hev-E-Oil Burners and using *commercial* No. 4 or 5 heavy oils, costing 3 to 6¢ *less* per gallon than domestic light oils. Owners not only pocket the difference in cash, but get 7% more heat per gallon as well.

Hev-E-Oil Burners are specifically designed for heating buildings requiring more than 6,000 gallons of oil or 45 tons of coal per year.

Conversion is simple. The Hev-E-Oil fits all types of standard heating boilers and change-over takes only a few hours' time. Reports on file show fuel savings pay for conversion in a season or two.

QUICK FACTS ON HEV-E-OIL BURNER

- Automatic, all-electric ignition
- Flame size set exactly to furnace capacity
- Low-pressure, air-atomizing, with large, non-clogging nozzle
- Six sizes: 1 to 60 gph
- Built-in low fire start
- As simple to install as a domestic burner
- Easy servicing and cleaning
- Air and oil metered to give high efficiency

If you own, specify, install or service burners, get all the facts about Hev-E-Oil Burner — a *quality* product of America's leading manufacturer of self-contained boilers and oil-fired equipment. Write for illustrated Bulletin AD-102 NOW. CLEAVER-BROOKS COMPANY, Dept. H, 315 E. Keefe Ave., Milwaukee, Wis.

Sales and Service In Principal Cities

Cleaver Brooks

HEV BURNERS ARE DESIGNED TO SAVE YOU MONEY

REACTOR DESIGN

(*Continued from page* 108)

struction and operation of the reactor on an industry-cooperative basis is contemplated.

The design permits simultaneous conduct of a large number of industrial projects with due regard for commercial secrecy when required. University and medical research programs will also be considered for the facility.

• **PARTICIPANTS.**—Three industrial nuclear engineering organizations participated in the preliminary study which, according to Dr. Edwin L. Zebroski, head of SRI's nuclear engineering group, shows encouragingly moderate cost for a 10,000 kilowatt reactor having fluxes comparable to the Atomic Energy Commission's material testing reactor.

Dr. Zebroski explained that both light and heavy-water designs were considered for a versatile facility useful for a wide range of research in the fields of physics, chemistry, metallurgy, medicine, food and agriculture. Production of radioisotopes for high intensity radiation sources would also be possible.

• **HOUSING.**—The housing plan calls for a pressure-tight building similar to a petroleum product storage tank. In what Dr. Zebroski describes as "a maximum inherent safety reactor design," there would be prevention of escape of radioactivity from any conceivable malfunction or sabotage of the reactor.

Site surveys have been completed on a number of suitable locations in California.

WATER DEMAND

for air conditioning may require excessive investment in distribution if waste is not prohibited.

Among the considerations arising from air conditioning installations is the fact that they "can create demands on a water distribution system which will require excessive investments which otherwise would not be required," the national convention of the American Society of Civil Engineers was told in St. Louis, June 14 by C. Kelsey Mathews, principal engineer of Burns & McDonnell, Kansas City, Missouri.

The situation can be controlled by prohibition of non-conserving installations by ordinance, said Mr. Mathews. It behooves the management of every water system to determine and check the status of air conditioning.

Mr. Mathews' paper was, in part, as follows:

• **MEASURES.**—Only in the past three or four years have water requirements of air conditioning units been recognized as important. A great many cities are not yet impressed with their significance and very few authentic data are available. In the comparatively few cities which have observed the rapidly increasing demand for water for nonconserving units, usually something has been done about it, in the nature of prohibiting ordinances or of changes in rate schedules which reflect the increased cost due to the extremely poor annual load factor of such installations.

• **INDICATORS.**—The effect of air conditioning is not generally realized, said Mr. Mathews. The effect of air conditioning on design of water distribution systems is different from the effect on treatment plants. The effect on distribution system design can be measured by comparison (1) of hourly demands ten years ago with present demands, (2) of ratios maximum hour to average day, and (3) of cost of improvements with and without non-conserved air conditioning. At Kansas City, these comparisons indicate excessive investment in distribution system if non-conserved air conditioning is not prohibited.

QUICK CORROSION

is objective of new testing method used on steel.

General Motors Research Laboratories Division has developed an indoor test that speeds nature's corrosive action on auto body steels.

Three members of the laboratories staff expressed the hope that their ability to hasten the rusting of metal may point the way to retard corrosion and prolong life of steels.

The GM spokesman, appearing at the Society of Automotive Engineers' Golden Anniversary Meeting, were Alfred L. Boegehold, assistant to the laboratories general manager; Dr. Robert F. Thomson, head of Metallurgy Department, and J. C. Holzwarth, metallurgy supervisor.

• **CYCLIC.**—They described their so-called cyclic humidty accelerated corrosion test "which appears to give the answers we are seeking" in basic corrosion studies. Already they have found that two types of rust attack body steels, one protective and the other non-protective.

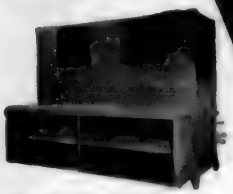
They cited examples of 20-day tests which produced results ordinarily requiring up to three years of outdoor exposure testing at Kure Beach, N. C., on the Atlantic Coast.

The GM researchers said they suspended bare steel panels in a constant temperature cabinet at 125 degrees Fahrenheit. The panels were rusted by humid air passing over them. The humidity was cycled between 100% and 10% for eight-hour periods.

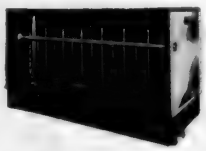
Every day for a 20-day period each panel was wetted with a dilute salt

WATER SAVER
Model QT. 3 and 5 ton sizes. Bulletin QT-1.

COMPLETE THE JOB with KENNARD Engineered AIR CONDITIONING EQUIPMENT

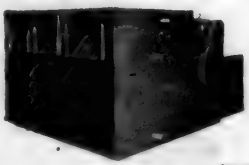


AIR CONDITIONING BLOWER UNITS—13 sizes. 300 to 21,600 CFM. Horizontal or Vertical. Catalog No. AC-1.

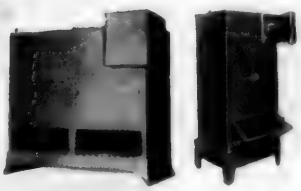


SPRAYED COIL DEHUMIDIFIERS—56 sizes. Coil Face Areas to 81 sq. ft. Catalog No. SC-1.

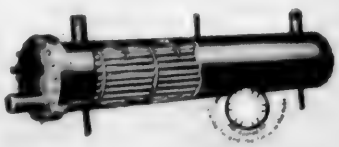
HEATING AND VENTILATING UNITS—Air Volumes 300 to 28,800 CFM. Catalog No. HV-1A.



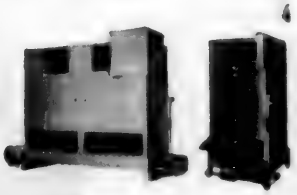
MULTI-ZONE UNITS—6 Sizes Cooling Coil Face Areas up to 36 sq. ft. Catalog No. MZ-1.



COOLING TOWERS Outdoor-Indoor. 3 to 75 tons. Catalogs No. CT-1 and KT-2.



LIQUID CHILLERS—direct expansion type. — Sizes 2 to 200 tons. Catalog No. LC-1.



EVAPORATIVE CONDENSERS—Indoor-Outdoor. 3 to 75 Tons. Catalogs No. EC-1 and EK-3.

FINNED COILS—Direct Expansion Coils, Water Coils, Steam Distributing Tube Coils, Standard Steam Coils. Sizes up to 36" wide x 120" long. Catalog No. EC-1.

Write for name of nearest representative and catalogs needed.

KENNARD CORP.
1823 S. HANLEY ROAD
ST. LOUIS 17, MO.

COOLING TOWER NEWS

These two Binks Cooling Towers cool water for industrial processing (see text)

Each of these cooling towers solves a specific problem...

The two towers illustrated above are on the roof of a large industrial plant. The one on the right cools 4000 gals. of quench water per minute. The other cools 2850 gals. of water a minute for electrical heat treating equipment. The air intakes on this tower are equipped with filters to trap all dirt and dust and to keep the cooling water clean.

The towers shown to the right are used in the air conditioning systems of two large commercial buildings. The one tower had no space restrictions, the other was very limited...But Binks Engineers met both conditions with a tower that assures excellent cooling, long trouble-free service and definite economies.

Engineering help available Binks manufactures cooling towers of all types and capacities ranging from small residential-types of 3 gpm to giant towers of 15,000 gpm. To help you get the right tower a Binks Engineer will study your needs and submit proposals without obligation. For full details write to:

This tower serves a large Chicago store using 500 tons of refrigeration

On top of a tall office building using 535 tons of air conditioning

Binks

EVERYTHING

A COMPLETE LINE OF NATURAL DRAFT AND MECHANICAL DRAFT COOLING TOWERS AND INDUSTRIAL SPRAY NOZZLES

BINKS MANUFACTURING COMPANY

3120-38 Carroll Ave., Chicago 12, Ill.

REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY

solution. Each humidity cycle produced a new layer of rust.

• **RUST TYPES.**—Of the two types of rust that form on body steels, the first develops on car exteriors where paint is chipped, scratched or abraded from the steel.

This causes discoloration but it can be controlled by polishing, waxing or touch-up painting. Even without such treatment, however, this type of rust forms a protective coating and retards further corrosion.

The second type of rust, known as "sheltered corrosion," occurs in hidden, inaccessible places from which moisture cannot escape. A non-protective rust eats into the metal.

The speakers said that in the laboratory they can duplicate sheltered corrosion. This permits them to weed out steels with poor rust resistance and select steel samples that indicate improved corrosion resistance.

The selected samples, in turn, can be used in further programs of actual service testing on automobile bodies.

• **SEARCH.**—Working on the theory that "one of the best places to reduce corrosion is where it starts—in the steel itself," the GM researchers described tests with various alloys in automotive sheet steel.

Among them were chromium, nickel, phosphorus, manganese, carbon, copper, etc. They said some alloys that contribute to protective rust do not show the same results when exposed to sheltered corrosion.

Thus, they are directing their efforts toward finding an additive or combination of elements in steel that will increase resistance to the second or "sheltered" type of rust—at a low cost.

AIR CONDITIONING

imposes summer peak on southern utilities. Heat pumps urged.

The rapid growth of the residential air conditioning industry has created new problems for the nation's electric utilities which can be solved by increased cooperative efforts between the two industries. A solution to these problems will mean greater service for consumers and more profits for utilities. This statement was made by Geo. S. Jones, Jr., managing director of the Air-Conditioning and Refriger-

National Champion

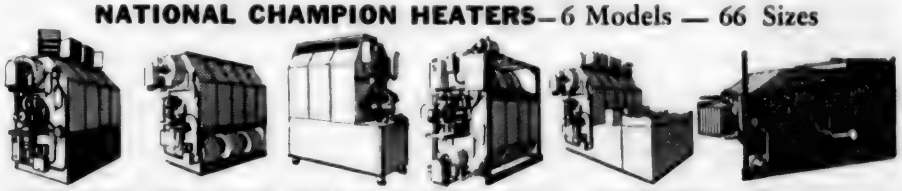
HAS THAT WINNING DRIVE!

"Sink" your heating problem in one easy stroke. Swing to National Champion Heaters. Whatever your heating need—space heating, tempering, make-up air, curing, drying or de-icing—there's a National Champion to do the job. Check these winning points:

- 80% guaranteed heating efficiency
- Direct fired for gas, oil or combination fuels
- Completely automatic controls — for constant, clean heat
- 70%-150% more heat transfer area than similar units
- Quieter, smoother operation — lowest blower RPM
- Highest available external static pressures
- Electronic flame failure control
- Completely wired, assembled and flame-tested at the factory to guarantee peak performance
- Listing by Underwriters' Laboratories, Inc.

Teardrop design Combustion Chamber the "heart" of National Champions

NATIONAL CHAMPION HEATERS—6 Models — 66 Sizes



Model M—vertical unit with discharge heads 17 sizes.

Model D—vertical unit for duct work. 12 sizes.

Model P—portable, vertical unit for flexible duty. 6 sizes

Model R—inverted unit with discharge heads at bottom. 12 sizes.

Model S—vertical unit with side blowers to permit proper location of air mixing dampers. 12 sizes.

Model C—horizontal ceiling suspension unit for space saving. 12 sizes.

200,000 to 2,000,000 BTU Capacities

Write today for complete information and specifications.

NATIONAL HEATER COMPANY, INC.
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Industrial Plants | Stores | Restaurants | Offices

7½-Hp. Frick Unit Conditioner

They All Like

FRICK

Unit Air Conditioners

Built in sizes of 3, 5 and 7½ hp., these Unit Conditioners have the extra cooling capacity, the greater dependability, the superior quietness and economy that discriminating buyers want. Get literature and full information now: join those who, since 1938, have found Frick Unit Air Conditioners the answer to their needs. Write

DEPENDABLE REFRIGERATION SINCE 1882
FRICK CO.
WAYNESBORO, PENNA. U.S.A.

take no less than these
TOP PERFORMANCE STANDARDS
for M&L FUEL OIL HEATERS

Expert design by experienced heating engineers

Carefully selected from a wide range of construction materials

Full protection against corrosion

M & L Guarantee against defects in workmanship and materials

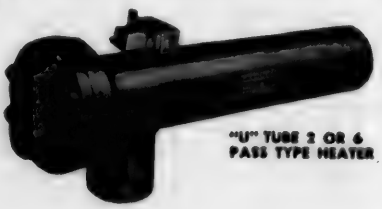
You can be sure of all these if you specify a
M & L FUEL OIL HEATER

There's a type for every fuel oil heating need—commercial or industrial.

They meet the standards of the Fuel Oil and Water Heater Manufacturing Association.

Send for our complete catalog including data on the new M & L Fuel Oil Guardian Heater (832-52-SA).*

*New York City Approval No.



"U" TUBE 2 OR 6 PASS TYPE HEATER

TANK OUTLET OIL HEATER

Manning & Lewis Engineering Co.
28 Ogden Street Newark 4, New Jersey
SALES REPRESENTATIVES IN PRINCIPAL CITIES

M&L

ation Institute at a Washington meeting.

• **LOAD.**—He called on the electric utilities to give "immediate and careful attention to the problems of increased load if they are to be solved and this greater service to the public is to be fully realized."

Reporting on a series of informal discussions he has held in recent months with many utility executives throughout the country, Mr. Jones said:

"My long experience with utility leaders and my contacts with them in recent months on the subject of air-conditioning, convinces me that the average utility executive is fully aware of the situation and is way ahead of us in his planning to take on this additional load."

• **PEAKS.**— Before air-conditioning, the peak demand for electricity occurred in the winter. In some parts of the North, this is still true. Where this situation exists, air-conditioning fills in the summer valleys and thus boosts the return on capital investment.

But in the South—and increasingly so in the North—the result of the greatly expanding air-conditioning industry has called for the utilization of added generating and distribution facilities which usually remain idle in the winter. And, so, the valleys usually occur in the winter. The utilities are seeking ways of eliminating these winter valleys. The air-conditioning industry is also vitally concerned with spreading out the electric utilities income over a period of 12 months. It feels that such a development will bring greater service to the consumer at minimum rates and encourage the purchase of air-conditioning equipment.

• **HEAT PUMP.**—The greatest single contribution made by the air-conditioning industry in reaching the objective is the development of the heat pump. This can be in the form of a single room air-conditioner or the larger central-station residential system.

Commenting on the role of the utilities in this development, Mr. Jones said:

"Much progress has been made in the development of the heat pump with resulting increases in sales. This has contributed toward the solution of the southern utilities' problem."

Ad-Digest SERVICE

Below and on the following pages are given brief digests of the advertisements appearing in this month's issue. Use this Digest to locate and refer to the advertisements in which you are particularly interested, then fill out and mail the prepaid postcard to request further information from manufacturers.

NOTE: While every attempt is made to list all advertisements, those which are received after the published closing date may not appear. The Index of Advertisers lists all the advertisments in this issue.

UNIT HEATERS. Inside front cover. Made in horizontal and vertical models, these unit heaters are available in gas-fired or steam and hot water types. The gas-fired heaters are available in seven sizes, ranging from 25,000 to 200,000 Btu per hr. input. The steam and hot water types are available in 18 sizes from 35,600 to 275,200 Btu per hr. total heat delivered....Item 201

CEILING AIR DIFFUSERS. Page 52. Ceiling air diffusers that are made in two different models can be installed in three simple steps and are easy to balance and adjust. Both the pattern and volume is accomplished on the face of the diffusers without tools. A full range of sizes is available. .....Item 202

COOLING TOWERS. Page 20. Engineered cooling towers are built in eight sizes from 15 to 75 tons. For indoor or outdoor use, the towers are corrosion proof, are made of sectional construction, and have long-lived operation. Smaller towers for home or business use are also manufactured by the company. Catalogs are available. .....Item 203

CAST IRON BOILER. Page 68. This cast iron boiler is designed for horizontal rotary oil burners. It has a large firebox volume, a high base, a special steel front plate, green enameled steel jacket, balanced gas travel, large waterways, and individual short draw rods. Catalog is available. .....Item 204

DIRECT-FIRED HEATERS. Page 153. Direct-fired heaters give heat when and where you need at the flick of a switch, which saves on low initial cost, and have full automatic controls. Available for gas, oil, coal, or dual gas and oil. Bulletin and engineering data sheet are available. .....Item 205

MATERIALS HANDLING FANS. Page 167. Designed primarily for use in conveying materials, the fans are also effective for dust, fume, and gas removal. Available in 19, 26 33, 40 and 51-in. wheel diameters, the units are adjustable for angular, horizontal, or vertical air discharge and reversible for clockwise or counter-clockwise rotation. Folder available.....Item 206

WELDING FITTINGS AND FLANGES. Page 32. A complete line of welding fittings and flanges includes stainless steel fittings and flanges such as used in acid-pumping stations. Alloys, non-ferrous metals and carbon steels are also among the more than 4,000 items in the line..Item 207

AIR DIFFUSERS. Page 153. Air diffusers with diffusing vanes provide air patterns unlimited without blank-off. The diffusers are made with square and rectangular outlet designs. The company's engineering staff and laboratory resources are available. .....Item 208

VIBRATION CONTROL. Page 127. Steel spring vibration isolators with adjustable leveling bolts prevent vibration and noise transmission from heavy air conditioning equipment to floors directly below. The isolators allow heavy upper floor installations without floor reinforcement, thereby making it possible to move air conditioning equipment upstairs. Bulletin available. .....Item 209

ZONE HEATING. Page 63. With zone heating, occupants may have any temperature they choose by setting the thermostat in their own room or office. Individual room air circulation prevents transmission of odors or bacteria from other rooms. No electricy is required to operate the circulating fans. A booklet for architects and builders, containing all necessary specifications, is available. .....Item 210

ELECTRONIC AIR FILTERS. Page 65. A dry-type electronic air filter with an electronically charged media requires no water or sewer connections and it needs no oil to retain precipitated dust. Each renewal of the filtering media restores the air filter to its original efficiency. In case of power failure, the unit still maintains filtration. Bulletin and product information are available. .....Item 211

ELECTRIC MOTORS. Page 51. Advanced engineering and improved techniques have been used in this line of completely enclosed motors to achieve a rotor with less noise and better balance. The motors can be engineered to meet special mechanical and electrical requirements. They are available in polyphase, squirrel cage, induction and single phase, capacitor-start, and induction-run types. .....Item 212

POWER ROOF EXHAUSTERS. Page 18. Forty-three power roof exhausters serve pharmaceutical laboratories by carrying the fumes from eleven buildings. Low silhouette, easy installation directly to the duct system, and ease of maintenance are features of the units which are made with direct drives from 150 to 11,000 cfm and with belt drive from 3,500 to 65,000 cfm, developing static pressures to 4 inches. Information available. .....Item 213

STEAM TRAPS. Page 60. Steam traps are available in a wide variety of types and sizes to prevent steam waste and save fuel for low, medium, or high pressure steam or compressed air service. The traps are available from 25 in. vacuum to 600 lb pressure. Bulletins are available....Item 214

HEATING-COOLING SYSTEMS. Page 50. The remote room units of this system heat, cool, filter, and recirculate the room air while a separate ventilating system brings fresh air into the room. The units come in a wide range of capacities and models to recirculate room air or to blend it with outside air. A piping circuit carries hot or chilled water from a centrally located boiler and water chiller to each individual room unit. Information available. .....Item 215

PNEUMATIC THERMOSTATS. Page 4. Pneumatic thermostats provide individual room control for each office and zone within the general office area of an international organization's new headquarters. The thermostat and peckless control valve control the air conditioning of the building to help maintain a perfect indoor climate. .....Item 216

SINGLE SEAT VALVES. Page 33. Single seat valves, for pressures up to 250 psi, have a renewable stainless steel disc and seat. These control valves are also available with a composition disc which gives straight line control. Bulletins are available. .....Item 217

SNOW REMOVAL TUBING. Page 123. Copper water tube for snow melting panels can be bent to conform to the terrain and is available in 60-ft lengths. Copper tube cannot rust, rot, or deteriorate. Technical advisory service and a 16mm motion picture are available. .....Item 218

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Circle numbers corresponding to the advertisements in which you are interested, print your name and address clearly. Information will be sent directly from manufacturers.

Ad-Digest SERVICE

PIPE INSULATION. Page 24. Glass fiber insulation was used on the pipes, ducts, and equipment of a 2,300-ton chilled water system that air conditions over 650,000 sq ft of area in the second highest building in the world. Pre-formed insulation was used on the pipe, and foil-faced insulation board was used on the ducts. Engineering data is available.....Item 219

LOW WATER CUTOFFS. Back cover. Low water cutoff controls for hot water boilers provide a float-operated mechanical means of adding water automatically when a low level condition occurs and interrupt current to the burner if the water level drops into the emergency zone. The feeder cutoff combinations are available for large and high pressure hot water space heating boilers. Engineering data and selection chart are available. .....Item 220

OIL LEAK DETECTION SYSTEM. Page 151. An oil leak detection system continuously monitors the purity of condensate leaving steam-type fuel oil heaters. It protects the boiler by removing oil contamination from the feed-water cycle. The system is engineered to the special requirements of each installation. Details are available. .....Item 221

STEAM BOILERS. Page 25. A sheet and tube plant chose four steam boilers rather than two larger boilers, leaving space for a fifth unit. The four units produce steam for both plant processing and heating. This type boiler is available in standard sizes to 40,000 lb of steam per hr at pressures to 235 psi. .....Item 222

GLASS FIBER PRODUCTS. Page 24. Glass fiber products are now being made by two manufacturers combined into one organization. Among the typical basic applications of glass fiber products are for duct insulation, underground pipe wrap, high temperature insulation, and translucent building panels. Additional information is available. .....Item 223

REVOLVING UNIT HEATERS. Page 141. The discharge outlets of revolving unit heaters keep the heated air in constant gentle motion with no steady blast of hot air. In the summer time with the steam off, the revolving discharge outlets produce a cooling effect. Bulletin on revolving heaters is available. .....Item 224

STAINLESS STEEL COOLING TOWER. Page 134. Stainless steel cooling towers will not corrode, require no rust-proofing, and are light in weight. The towers are made in six different sizes from 2 to 15 tons with a redwood wet deck surface and a gravity-type distributor basin. Literature and prices are available. ...Item 225

POWER ROOF VENTILATORS. Page 134. Power roof ventilators have advanced modern design to fulfill architectural styling and job performance requirements. The ventilators are made with air capacities from 550 to 30,000 cfm and with belt or direct drives. A booklet is available that gives the design, construction, and performance data of the ventilators. .....Item 226

ELECTRIC MOTORS. Page 134. Electric motors help product designers solve their problems. The motors are made with standard or special mountings designed to individual specification with ratings from 1/3 to 5 hp. Coolant pump motors and double shaft blower motors are among the types made. Bulletin is available....Item 227

MULTIPLE ALUMINUM INSULATION. Page 7. Multiple accordion aluminum insulation installed on the warm side of exterior walls and roof spaces will prevent water vapor from condensing in outer building spaces. The sheets of metal are installed between wood joists and must be full width without breaks every few feet. Technical bulletin on water vapor is available. .....Item 228

FLUSH VALVES. Page 11. Foot pedal flush valves are being installed in a comprehensive medical center in upper New York City. A handbook and catalog is available that is designed for everyday reference. It has 19 pages of installation details for exposed, concealed, and special flush valve installations. Over 75 blue-prints, cut-away views, and charts are also in the catalog. .....Item 229

INDUSTRIAL HEATERS. Page 145. Industrial heaters are made with capacities from 200,000 to 2,000,000 Btu per hr for space heating, tempering, make-up air, curing, drying, or de-icing. They are available with automatic controls and are direct-fired for gas, oil, or combination fuels. Their combustion chamber has a teardrop design. Information and specifications are available. .....Item 230

METAL FRAME PIPE RACKING. Page 67. Heavy lines are easily supported on this sturdy metal framing. Clamps, concrete inserts, hangers, and rollers are among the many accessories for the framing. No welding or drilling is required to install it, and additions or alterations can be made at any time. A 76-page catalog is available showing how to rack, frame, suspend, and support mechanical and electrical equipment. .....Item 231

CONTROL SYSTEM. Pages 38-39. One company's engineered control system provides made-to-order weather for each of ninety stores in a large shopping center. The system includes controls for twin air handling units, damper operators, thermostats, and multi-zone air conditioning units. .....Item 232

FANS AND BLOWERS. Pages 14-15. This company's fan and blower engineers and motor engineers work together to design and produce fans and blowers whose frames are all welded; wheels and fans are dynamically balanced; motors are selected to match performance ratings; drives, belts, and controllers are chosen for specific jobs. Two catalogs are available for use by architects, contractors, and engineers. .....Item 233

AIR CONDITIONED TEST CABINET. Page 151. An air conditioned test cabinet is used to determine the effects of controlled temperature and humidity conditions on test subjects. It has a range from freezing temperature to 150 deg F. dry bulb. The air conditioning is enclosed in an insulated cabinet adjoining the test cabinet. Information available. ...Item 234

WROUGHT IRON PIPE. Page 5. Wrought iron pipe for radiant heating in churches has a long service life, is readily formed and welded, has a high rate of heat emission, withstands damage during handling and installation, and expands and contracts at virtually the same rate as concrete. Details available. .....Item 235

COOLING TOWERS. Page 62. This new series of cooling towers, is made with more wetted surface in each cubic foot and with high pressure down spray on closer centers. The towers are made of redwood encased in asbestos cement board. Steel cased and all-steel models are available. .....Item 236

PROPELLER-FAN HEATER. Pages 40-41. This propeller-fan unit heater has a universal heating coil of continuous tube design that performs equally well with either steam or hot water. The unit heater is made in a choice of 24 models, 8 basic sizes, with capacities ranging from 15,000 to 335,000 Btu per hr. .....Item 237

PLUMBING FIXTURES. Page 47. Off-the-floor plumbing fixtures add spaciousness to washrooms; free washrooms of litter-traps and breeding grounds for bacteria; and do away with obstacles to easy cleaning and hospital-like sanitation. The entire stress of the fixture is on the fitting, not on the wall. Booklet available. .....Item 238

CONTINUOUS WELD PIPE. Page 23. Continuous weld pipe made from nickel-copper steel composition can be used for severe service that involves corrosion and abrasion. It is now available in pipe sizes from ¼ to 4 in. Booklet on continuous weld pipe is available. .....Item 239

CENTRAL STATION EQUIPMENT. Pages 44-45. This company's line of central station equipment enables its dealers to take on any air conditioning job. The line of equipment includes Freon compressors, liquid chillers, induction circulators, evaporative units, and air handling units. .....Item 240

POWERED FASTENERS. Page 155. A manufacturer of powder powered fasteners, for fastening into steel and concrete, offers versatile tools and fasteners, the ingenuity and skill of its engineers, and how-to-do-it application data. .....Item 241

COOLING TOWERS AND CONDENSERS. Page 17. Cooling towers, in 3 to 120-ton capacities, and water-cooled condensers, in 1/3 to 12-ton capacities, are matched to work with each other. The wetted deck surfaces of the towers carry a 20-year guarantee against rotting or fungus attack. The condenser's tubes can be cleaned by a mechanical cleaning tool to restore heat transfer efficiency. Detailed specifications are available. .....Item 242

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AIR CONDITIONING, HEATING AND VENTILATING

93 WORTH STREET

NEW YORK 13, N. Y.

AD-DIGEST SERVICE

PIPE INSULATION. Page 21. Made of fine glass fibers, this one-piece molded pipe insulation can be re-used when piping is changed around to accommodate new processes. The insulation is snapped on over the pipe and can be snapped off. It can be used to insulate cold or heated piping where temperatures do not exceed 350 deg F and is available in a range of sizes up to 33 in. Story available. .....Item 243

AUTOMATIC SHUTTER. Page 156. An automatic shutter for unit blowers is self-contained in an adapter sleeve for attachment to the blower. Weather stripped, the shutter has light gage aluminum louvers with felt silencer strips. Catalog, circular, and prices are available. .....Item 244

HEAVY-OIL BURNER. Page 142. Oil burners designed for heating buildings that require more than 6000 gallons of oil or 45 tons of coal per year will burn commercial No. 4 or 5 heavy oils. Conversion is simple; the burner fits all types of standard heating boilers. Illustrated bulletin available for those who own, specify, install, or service burners. .....Item 245

CIRCULATING PUMPS. Page 49. A line of close-coupled and flexible-coupled pumps is made with capacities from 5 to 400 gpm and heads from 10 to 180 ft for water supply systems, cooling tower circulating, air conditioning systems, hot and chilled water circulating, pneumatic water systems, and booster service. Two bulletins are available. .....Item 246

AIR CONDITIONING SYSTEMS. Page 69. Commercial and industrial air conditioning systems are designed by one company to meet its customer's needs. The company solves specialized problems and offers individual engineering guidance and continuing local service from a nation-wide network of personnel and facilities. Details on air conditioning service available. .....Item 247

COPPER TUBING. Page 135. This company disciplines copper into seamless tube, pipe, and fittings by putting it through its smelter, electrolytic refining tanks, piercing mills and extrusion presses, drawbenches, and through coiling, annealing, straightening, and testing equipment. .....Item 248

SPLIT CONSTRUCTION BOILER. Page 25. A split construction boiler was installed in a New England library without requiring alterations or welding in the field. The boiler is delivered in two watertight sections. The company's heating systems deliver steam and hot water and are fired automatically with gas, stoker, or oil. Details available. .....Item 249

RELIEF VALVES. Inside back cover. Relief valves for Freon and similar refrigerants and for ammonia are constructed in accordance with the standards of the ASME. They are made in straight-through and angle types. In addition, the valves are stamped NB to indicate National Board Certification of their capacities. Data sheet showing capacity ratings is available. .....Item 250

REFRIGERANT FILTER-DRYER. Page 19. Filter-dryer combinations are available for drying and cleaning refrigerants of acids and sludge. The combination has a thermostatic expansion valve that prevents alternate flooding and starving of evaporators. The nozzle and conical button of the refrigerant distributors are designed to assure uniform distribution to all circuits. .....Item 251

AUTOMATIC CONTROLS. Page 61. Electric-electronic controls for heating, ventilating, cooling, and humidifying are installed in a telephone company's buildings. Two outdoor reset control systems were installed; one system controls ceiling panel heating, the other, hot water radiation. Ventilating equipment and humidifiers are likewise equipped with individual control systems. Engineering counsel and literature are available. .....Item 252

UNDERGROUND PIPE INSULATION. Page 35. Approximately 40 tons of insulation were poured and tamped on 1200 ft of the hot fuel and steam lines of a Southwestern steam electric station. The insulation forms three zones of protection against heat loss; it needs no sleeves or mechanical sheaths and is available in three types for temperature ranges to 520 deg F. Information available. .....Item 253

CENTRIFUGAL ROOF FANS. Page 136. These V-belt driven centrifugal roof fans have low velocities and low rotational speeds to provide a hushed air movement for ventilating modern buildings. The fans have spun aluminum housings and are made in capacities from 400 to 4000 cfm. Engineering literature available. .Item 254

COPPER TUBE AND FITTINGS. Pages 36-37. This manufacturer's copper tube and fittings were chosen for the plumbing and air conditioning system of a 15-million dollar hotel. Because the copper tube and fittings can be installed readily, they substantially reduce installation costs. .....Item 255

RADIANT PANEL HEATING. Page 23. Radiant panel heating with steel pipe provides concealed heating sources that thwart vandalism in schools. As the heat transmission medium, steel pipe has been used for more than 60 years for conventional hot water and steam heating applications. A 48-page color booklet on radiant panel heating with steel pipe and a 32-page companion booklet on snow melting and ice removal systems are both available. .....Item 256

REFRIGERANT DISTRIBUTOR. Page 29. This Venturi distributor assures equal refrigerant distribution to all passes of a multi-circuit evaporator. Made of one piece, it works in vertical, upside-down, or horizontal positions and has an application range from 25% to 150% of rated capacity. Catalog available.....Item 257

AIR FILTER DISCUSSION. Page 50. Should grease filters operate at high or low velocity? Where ventilating filters should not be used. Both these topics are discussed by a filter engineer for an air filter manufacturer.....Item 258

GALVANIZED SHEET STEEL. Page 27. Anything that can be made of steel sheets can be made with these galvanized sheets. The galvanized sheet is a soft, ductile sheet with a zinc coating that is tight enough to permit it to make anything that can be made of steel sheets. Details available..... .....Item 259

Use this digest to locate and refer to advertisements appearing in this issue of AIR CONDITIONING, HEATING AND VENTILATING, then fill out and mail the prepaid postcard to request further information.

MOTOR-STARTER COMBINATION. Page 48. A two-step increment motor and starter combination permits starting large polyphase motors with minimum line voltage disturbance. Voltage disturbances on the line are reduced because current taken from the line is not broken during the starting period. Polyphase motors in ratings to 400 hp are available with increment-type starters. Information available. .....Item 260

HEAT EXCHANGERS. Page 13. A tapered fin with a wide contact base is used on these heat exchangers. It is not necessary to crimp the tapered fins to provide the required contact area. The use of the tapered fin permits more fins per inch with no increase in air friction.....Item 261

WATER-TUBE PACKAGE GENERATOR. Page 139. Water-tube package generators are available in fourteen standard sizes from 6000 to 45,000 lbs. of steam per hour, or equivalent in high temperature, high pressure hot water. Steel encased, the unit is made of selected materials and a two-drum bent tube design for maximum use of boiler space. .....Item 262

UNIT AIR CONDITIONERS. Page 145. Built in sizes of 3, 5 and 7½ hp, these unit air conditioners are made with cooling capacities for industrial plants, stores, restaurants and offices. Literature and information are available. .....Item 263

VALVE GAGING. Page 54. The taper, size, and guide slot alignment of this company's gate valve discs are checked by 61,167 gages to insure dimensional accuracy. Every disc must correspond to the setting indicators.....Item 264

WATER HEATERS. Page 34. Tankless and indirect water heaters are available for installations using hot water, exhaust steam, or live steam. Among the industrial fluid-heating equipment available from this manufacturer are instantaneous water heaters, converters, tank heating units, storage tanks, fuel oil heaters, and indirect heaters. Catalog available.....Item 265

DRAFT CUTOFF SWITCH. Page 154. This draft cutoff switch is designed to prevent explosions or damage to boilers by automatically cutting off the burner when the draft fails. Available for positive or negative operation, the switch has a time delay which prevents shut down from puffs. Information available on specially engineered models.....Item 266

Circle numbers corresponding to the advertisements in which you are interested, print your name and address clearly. Information will be sent directly from manufacturers.

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AIR-COOLED AIR CONDITIONER. Page 134. An air-cooled air conditioner can cool an entire house using existing ducts and standard electrical connections. It is available in a 2-hp floor model that requires no ducts and in 2 and 3-hp units for an attic, roof, or outside installation. The latter units can also be used for slab floor or basement tie-in. Complete details are available. ..... Item 267

PACKAGE STEAM BOILERS. Page 86. These package steam boilers have a two-pass design that provides even flow of combustion gases to all heating surfaces. The heating surfaces in the boilers are arranged so that there is a centrally located furnace and equal spacing of return tubes. Bulletins with detailed information are available. ..... Item 268

VENTILATING FANS. Page 89. The kitchens of a luxury resort hotel are supplied with cooling air by two of this company's ventilating fans. The fans keep their zones thoroughly ventilated at all times with little noise and attention. ..... Item 269

BOILER WATER LEVEL CONTROL. Page 152. This boiler water level control consists of a magnetic sleeve rising and falling within a non-magnetic tube; it trips or releases a permanent magnet attached to a mercury switch. The units are available in single or multi-stage models for all control applications. Standard boiler units are available for pressures of 15 to 600 lb WSP. Catalog and information are available. ..... Item 270

AIR RECOVERY UNITS. Page 86. Air recovery units were used to decontaminate the air in an overhead traveling crane cab that works in an atmosphere contaminated by sulphur dioxide and other toxic fumes and gases. The units decontaminate recirculated air through activated carbon in combination with heavy-duty air filters. Solutions to air conditioning or ventilating problems are available. ..... Item 271

AIR CONDITIONING DEADLINE. Page 68. This manufacturer helped a contractor meet a 120-day air conditioning installation deadline. The company had to tailor-make, ship, and install 18 blower supply and exhaust fans within the 120-day period. The system also includes 28 unit heaters, heating and cooling coils. ..... Item 272

FLEXIBLE HOSE. Page 152. Flexible hose for dust or chip collection, fume control, or ventilation is available in 1¼ to 26 in. ID. Made of Neoprene-impregnated cotton or Nylon, the hose can be bent to conform to any installation requirement. Bulletins giving data on flow characteristics, installation procedure, sizes, and prices are available. ..... Item 273

FOUR-WAY UNIT HEATER. Page 138. Eight sizes of unit heaters, which deliver heat in four directions, are made from 82,000 to 580,000 Btu per hr. Less piping, valves, and fittings are needed. A horizontal air discharge unit heater and a projection type unit heater are also made. Folder and selection data are available. ..... Item 274

BOILER WATER PUMPS. Page 31. Designed for boilers up to 250 hp and discharge pressures up to 150 lb, these turbine pumps are used for supplying water to the boiler, when boiler water is lost through use of steam in processing plants. Condensate and vertical pumps are also offered. Bulletins and engineering data are available. ..... Item 275

FLOAT AND THERMOSTATIC TRAPS. Page 64. Float and thermostatic traps, for low and medium pressure applications, can remove all the air and condensate from steam mains, branches, risers, unit heaters, coils, and similar applications. The low pressure trap is for pressures up to 15 psi, the medium trap for pressures of 15 to 125 psi. Write for heating specialties catalog. ..... Item 276

DUCTLESS AIR CONDITIONERS. Page 125. These air conditioners for institutional or commercial installations eliminate duct systems and structural alterations. The same piping, water supply and drain, serves for both cooling and heating. They are made in ceiling, overhead, concealed, and console models. Bulletin available. ..... Item 277

WELDED MOTOR-COMPRESSORS. Page 137. Heavy-duty, high-power-factor motor delivers plenty of power with minimum current consumption. Freon-12 and Freon-22 models available. Use of Freon-12 can give as much as 75 deg F lower temperatures in windings, crankcase, oil, and discharge side. Information available. Item 278

CONTINUOUS RIDGE VENTILATOR. Page 140. Ventilators for heavy industrial installations, where high heat or fumes require the removal of large volumes of air, are made in sizes from 4 to 96 in. The ventilator, in effect, converts the roof ridge to a giant air valve. A free data-book is available. ..... Item 279

COOLING TOWER APPLICATIONS. Page 144. Two cooling towers on the roof of a large industrial plant cool a total of 2,850 gpm of water. Two other towers are used in the air conditioning systems of commercial buildings. One serves a store using 300 tons of the refrigeration, the other a tall office building using 535 tons of air conditioning. The company manufactures towers from residential types of 3 gpm to towers of 15,000 gpm. Engineering help available. ..... Item 280

CUT PIPING LAYOUT COSTS. Page 141. A pipe fabrication service can save time, material, and labor costs by eliminating numerous flanged joints and combining several fittings into one integral unit. All types of materials are fabricated according to buyer's specifications, in sizes from 3 to 44 in. in diameter and thicknesses to ¾ in. Bulletin available. ..... Item 281

UNIT COOLER. Page 154. A ceiling-type cooler for food processing and storage is designed especially to conserve space, maintain proper temperature, produce even air motion, and reduce shrinkage. Folder available. ..... Item 282

SPRAY NOZZLES. Page 23. A new peak in spraying efficiency is obtained with these non-clog nozzles, available in either cone spray or fan spray types. The former is for cooling, re-cooling, washing, rinsing, air conditioning, and similar operations; the latter is for surface washing. The cone type is available in three types. Spray nozzle bulletin available. ..... Item 283

TEMPERATURE REGULATORS. Page 46. These regulators are guaranteed to shut tight when the demand for steam ceases. Expensive steam leaks due to a lack of tight shutoff are eliminated. Bulletin available. ..... Item 284

FUEL OIL HEATERS. Page 148. This company manufactures fuel oil heaters for commercial and industrial needs. Among the several types that are made, are a U-tube, 2 or 4 pass heater and a tank outlet oil heater. The heaters are made to meet the standards of the Fuel Oil and Water Heater Mfg. Association. Catalog available, including data on a new heater. ..... Item 285

TANK CATALOG. Page 155. A 24-page reference catalog is available for architects, engineers, and plumbing and heating wholesalers and contractors who specify, order, or buy: hot or cold water storage tanks; air receivers, flash, surge, condensate, and blow-off tanks; or hot water generators or heat exchangers. ..... Item 286

AIR CONDITIONING EQUIPMENT. Page 143. This company manufactures a selection of air conditioning equipment for complete installations. Among its products are water savers, blower units, sprayed coil dehumidifiers, heating and ventilating units, multi-zone units, indoor and outdoor cooling towers, liquid chillers, evaporative condensers, and finned coils. A catalog on each type of equipment is available. ..... Item 287

VENTILATORS. Page 153. This company's ventilators are made in both blower or propeller types. The units are easy to install, are all aluminum, have a low silhouette, and their motor is sealed from the air stream. Catalog available. ..... Item 288

PERIMETER HEATING. Page 1. Perimeter heating is provided in Southern schools by wall convectors mounted along exposed walls. They warm the air in the room, the floors, and inside surfaces of outside walls. Minimum piping, fewer risers, no hung ceilings or furred columns to conceal piping are used by the system. Literature is available. ..... Item 289

DRY EXPANSION COOLERS. Page 131. Six dry expansion Freon coolers of this company were engineered and installed in a large candy manufacturing plant. Two-circuit type coolers which chill a glycol solution are located in the basement and the third and fifth floors. The re-heating principle is used to cool the air and wring it to the proper humidity. Illustrated literature and engineering suggestions are available. ..... Item 290

AXIAL-FLOW FANS. Page 1. An axial-flow fan with a divided housing gives positively controlled boiler draft without the expense of erecting a tall stack. The fan installs horizontally, vertically, or at an angle that fits the boiler room layout. The fans are made for high-pressure boilers delivering up to 60,000 lb of steam per hr and for low-pressure boilers rated up to 180,000 EDR. Catalog with fan data is available. ..... Item 291

OIL UNIT HEATERS. Page 137. An oil unit heater enabled an auto laundry to remain open in cold weather. Installed near the entrance, the heater requires no large chimney, boilers, or pipes. It suspends out of the way and operates on low cost No. 2 oil. When the outside temperature is 0 deg F the temperature through the building is 50 deg. New catalog is available. ..... Item 292

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Paracoil OIL-LEAK DETECTION SYSTEM

for

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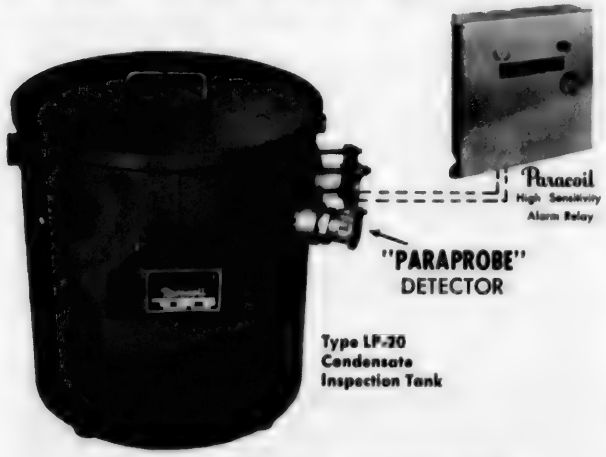

Continuously Monitors the Purity of Condensate leaving Steam-Type Fuel Oil Heaters

- **Isolates all fuel oil entrained in the condensate stream**
- **Gives alarm to plant Personnel**
- **Protects the boiler by removing oil contamination from feed-water cycle**
- **Applicable to both low and high pressure steam plants**
- **Engineered to the special requirements of each installation**

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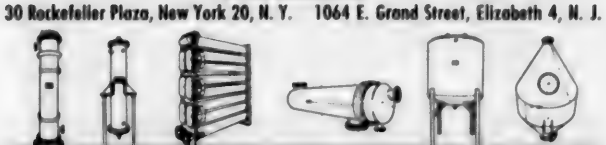

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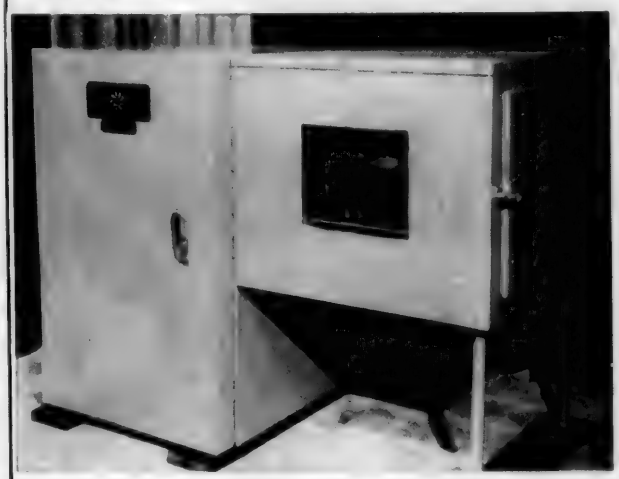

AIR CONDITIONED TEST CABINET

USES—to determine effects of controlled temperature and humidity conditions on test subjects of all kinds—to test processes—to find optimum conditions.

RANGE—With water and electric power services only, the range is from freezing temperature up to 150°F (dry bulb). With refrigeration, and using Niagara No-Frost Liquid to prevent freezing of sprays, you achieve dew point temperatures as low as minus 30° F. Control of relative humidity from 5% to 95% is obtained at all temperatures in this range. Air capacity is 200, 400 or 600 c.f.m.

METHOD—Air is saturated in the air-conditioning unit at the required dew point temperature and reheated to the desired dry bulb temperature. This is the method of the Niagara Type A Air Conditioner which has been proven for the most exacting duty over twenty-five years.

CONTROL—The dew point thermostat is located in the air stream, the dry bulb thermostat in the test cabinet. No moisture sensitive instruments are needed. Recorders may be used to obtain a complete record of conditions.

TEST CABINET—(inside) dimensions are 30" x 28" x 24" with access clear opening 26" x 22". Insulation is the equivalent of 4" cork.

AIR CONDITIONING UNIT is enclosed in an insulated cabinet adjoining the test cabinet. A door the full size of the cabinet wall gives complete access.

Write for Complete Information. Address Dept. H.V.

NIAGARA BLOWER COMPANY

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District Engineers in Principal Cities of United States and Canada

Buy Priceless BOILER SAFETY with "PIGGY BANK PENNIES"

MAGNETROL

The World's Safest Boiler Water Level Control

A magnetic sleeve, rising and falling within a non-magnetic tube, "trips" or releases an Alnico permanent magnet attached to a mercury switch. Basically, this is Magnetrol.

With boilers you're either SAFE OR YOU'RE NOT! There's no in between. Provide the assured safety of Magnetrol for only pennies more!

Magnetrol uses only infallible magnetic force to provide completely positive boiler water level control.

Inherently and by design this is the safest system known! . . . and the *only* one that insures all these benefits:

INFINITE OPERATING LIFE—there are no bellows, diaphragms, electrodes or packing boxes to fail.

LEAST SERVICING entailing call-backs or operating interruptions. The lifetime quality built into Magnetrol extends to every part.

EASIEST, SIMPLEST MAINTENANCE—normally confined to visual inspection and blow-down.

EASIEST TO ADJUST IN THE FIELD—this means simpler installation and certainty of proper functioning.

Magnetrol units are available in single or multi-stage models for all control applications. Standard boiler units for pressures of 25 to 600 lbs. WSP.

THE FULL STORY IS SO IMPORTANT IT BELONGS IN YOUR HANDS. MAIL COUPON NOW.

MAGNETROL, Inc.

MAGNETROL, Inc. 2106 S. Marshall Blvd., Chicago 23, Ill.

Gentlemen: Please send me Catalog Section III and full information on Magnetrol Boiler Water Level Controls.

NAME_____

COMPANY NAME_____

ADDRESS_____

COMING EVENTS

Where listed, names or titles of individuals are those from whom further information is available.

INTERNATIONAL CONGRESS OF REFRIGERATION—Ninth International Congress of Refrigeration, sponsored by the International Institute of Refrigeration, to be held in the conference rooms of the Sorbonne in Paris, France. General Secretariat of the Congress, International Institute of Refrigeration, 177, Boulevard Malesherbes, Paris, France . . . . . **AUGUST 31-SEPTEMBER 15, 1955.**

INSTRUMENT SOCIETY CONFERENCE—Tenth Annual Conference and Exhibit of the Instrument Society of America, to be held at Shrine Exposition Hall and Shrine Auditorium, Los Angeles, Calif. John McCaffery, assistant executive secretary of the Society, 1319 Allegheny Ave., Pittsburgh 33, Pa. . . . . **SEPTEMBER 12-16, 1955.**

WHOLESALE PLUMBING AND HEATING CONVENTION—4th annual convention of the American Institute of Wholesale Plumbing and Heating Supply Associations, Inc., to be held at the Hotel Waldorf-Astoria, New York, N. Y. G. T. Underwood, executive secretary of the Institute, 402 Albee Building, 1426 G St., N. W., Washington, D. C. . . . . **SEPTEMBER 17-21, 1955.**

ASME MEETING—Annual meeting of the American Society of Mechanical Engineers, at Roosevelt Hotel, New Orleans, La. Secretary of the Society, 29 W. 39th St., New York, N. Y. . . . . **SEPTEMBER 25-29, 1955.**

GAMA MEETING—Annual meeting of the Gas Appliance Manufacturers Association, at the El Mirador, Palm Spirngs, Calif. H. Leigh Whitelaw, managing director of the Association, 60 E. 42nd St., New York,. N. Y. . . . . **OCTOBER 12-14, 1955.**

AGA CONVENTION—1955 convention of the American Gas Association and the Pacific Coast Gas Association, at the Statler Hotel, Los Angeles, Calif. Secretary of the AGA, 420 Lexington Ave., New York 17, N. Y. . . . . **OCTOBER 17-19, 1955.**

ASA MEETING—Annual meeting of the American Standards Association, at the Sheraton Park Hotel, Washington, D.C. Secretary of the Association, 70 E. 45th St., New York 17, N. Y. . . . . **OCTOBER 24-26, 1955.**

SOLAR ENERGY SYMPOSIUM—A World Symposium on Applied Solar Energy, sponsored by Stanford Research Institute, Stanford, Calif., to be held at Phoenix, Ariz. Chairman of the Institute, 612 S. Flower St., Room 332, Los Angeles 14, Calif. . . . . **NOVEMBER 2-5, 1955.**

ASME MEETING—75th anniversary meeting of the American Society of Mechanical Engineers, at the Hilton and Blackstone Hotels, Chicago, Ill. Secretary of the Society, 29 W. 39th St., New York, N. Y. . . . . **NOVEMBER 13-18, 1955.**

POWER EXPOSITION—Chicago Exposition of Power & Mechanical Engineering, at the Coliseum, Chicago, Ill., to be held under the auspices of The American Society of Mechanical Engineers, in conjunction with their 75th Anniversary meeting. E. K. Stevens, manager, International Exposition Co., Inc., 480 Lexington Ave., New York, N. Y. . . . . **NOVEMBER 14-18, 1955.**

ASRE WINTER MEETING—Winter meeting of the American Society of Refrigerating Engineers, at the Hotel Statler, New York, N. Y. R. C. Cross, secretary of the Society, 234 Fifth Ave., New York 1, N. Y. . . . . **NOVEMBER 27-30, 1955.**

CHEMICAL ENGINEERS MEETING—Annual meeting of American Institute of Chemical Engineering, at the Statler Hotel, Detroit, Mich. Secretary of the Intsitute, 29 W. 39th St., New York 18, N. Y. . . . . **NOVEMBER 27-30,1955.**

REFRIGERATION EXPOSITION—9th Exposition of the Air-Conditioning and Refrigeration Industry, at Atlantic City, N. J., sponsored by the Air-Conditioning and Refrigeration Institute. The name of this trade show, formerly known as the All-Industry Refrigeration and Air Conditioning Exposition, has been officially changed. George Jones, executive secretary of the Institute, 1346 Connecticut Ave., N. W., Washington, D. C. . . . . **NOVEMBER 28—DECEMBER 1, 1955.**

CHEMICAL INDUSTRIES EXPOSITION—25th exposition of Chemical Industries, at Commercial Museum and Convention Hall, Philadelphia, Pa. E. K. Stevens, manager, International Exposition Co., 480 Lexington Ave., New York 17, N. Y. . . . . **DECEMBER 5-9, 1955.**

ATOMIC EXPOSITION—1955 Atomic Exposition, sponsored by American Institute of Chemical Engineers, at Municipal Auditorium and Annexes, Cleveland, Ohio. A. F. Denham, director of Atomic Exposition Management, 931 Book Building, Detroit 26, Mich. . . . . **DECEMBER 10-16, 1955.**

NUCLEAR CONGRESS—Nuclear Congress and Atomic Exposition, sponsored by the Engineers Joint Council, to be held in Cleveland, Ohio. Stewart E. Reimel, secretary of the Council, 29 W. 39th St., New York 18, N. Y. **DECEMBER 12-17, 1955.**

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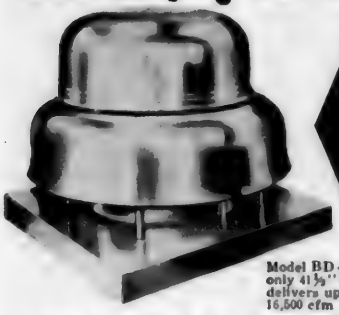

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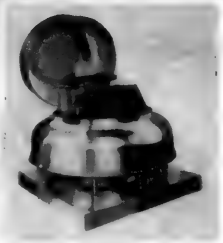

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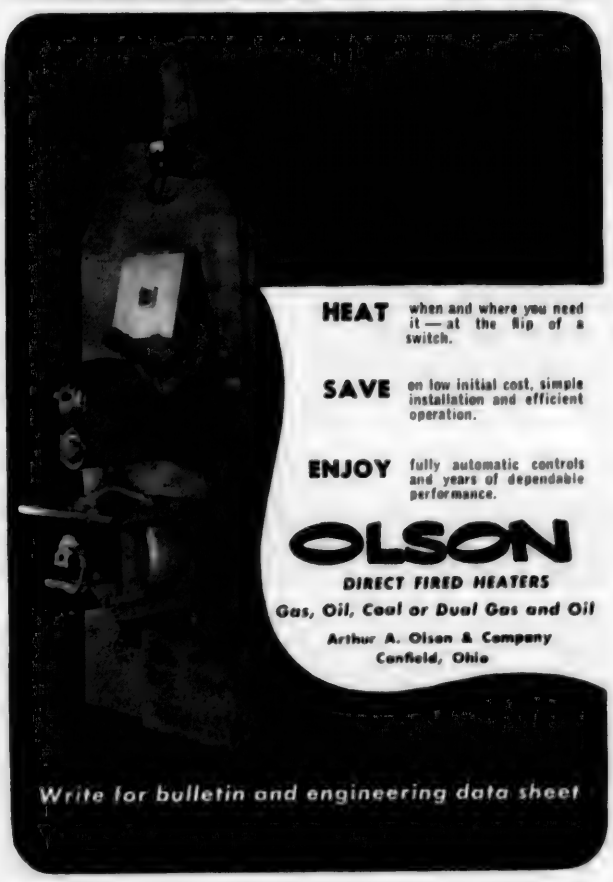

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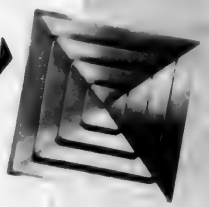

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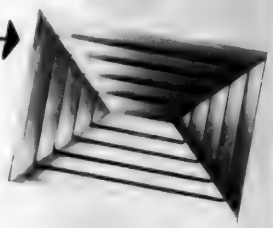

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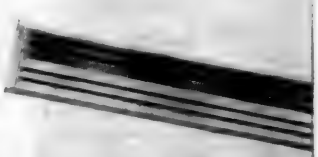

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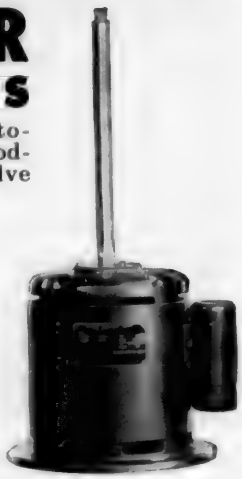
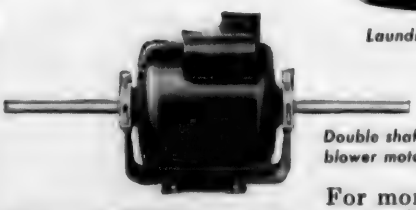


Laundry extractor motor



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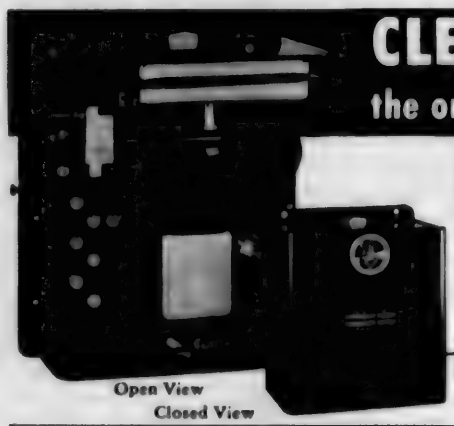

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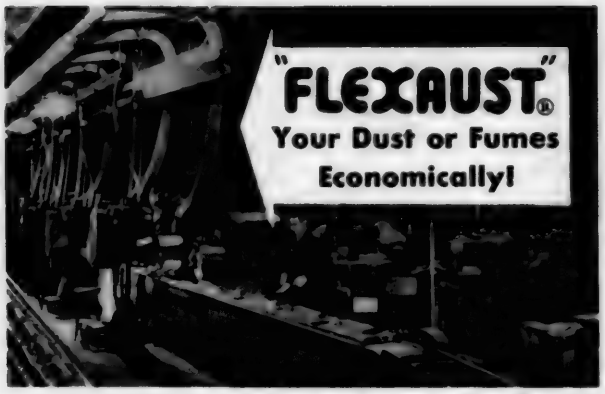

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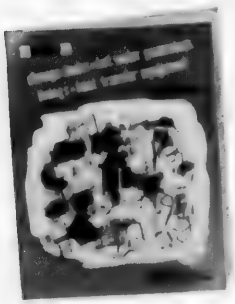

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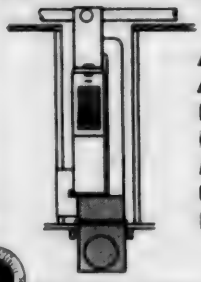

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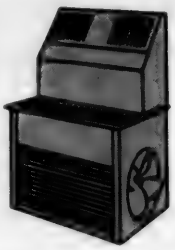

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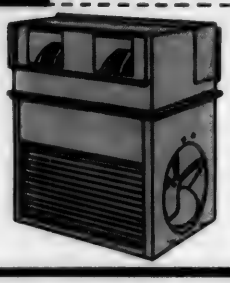

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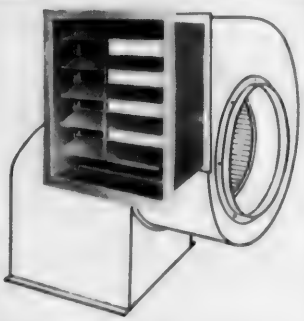

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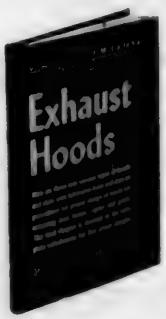

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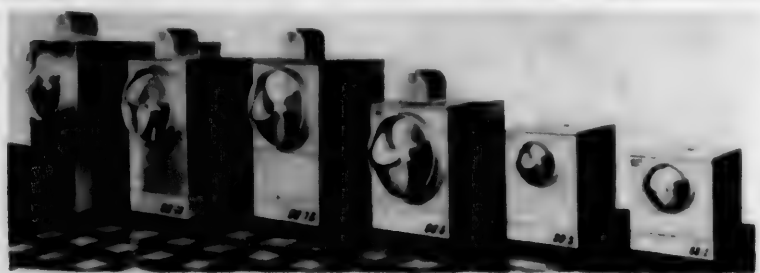

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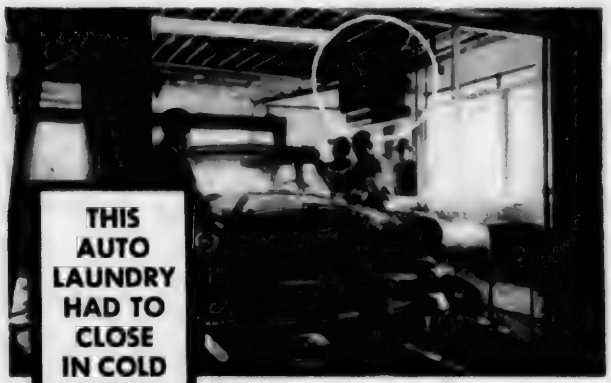

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New Aerovent "MH" Fans, designed primarily for use in conveying production and waste materials, are also effective for dust, fume and gas removal in foundries, mills and general industrial areas.

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KORFUND VIBRATION CONTROL *allows more rentable space*

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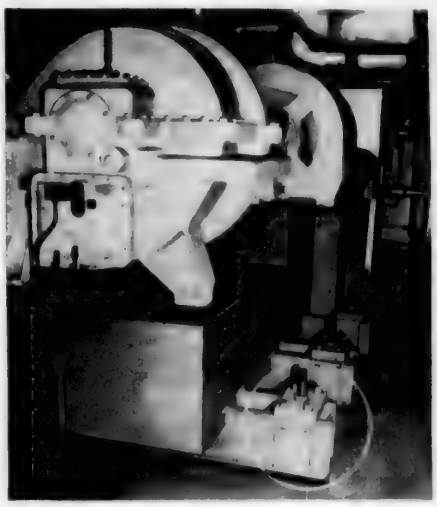

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This is just one of hundreds of successful upper floor installations of heavy air conditioning equipment on Korfund spring isolators. Only Korfund Vibro-Isolators allow really heavy upper floor installations without floor reinforcement and with positive assurance of vibration and noise control.

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For specific recommendations, contact us or your local Korfund Office. Look under "Korfund" in your local Telephone Directory or Thomas' Register. A half-century of experience is at your disposal.

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AIR CONDITIONING EQUIPMENT MAINTENANCE

Maintenance of air conditioning equipment includes the following:

Air Handling Equipment. Treating water for washers, replacing or cleaning air filters, checking fan belts, lubrication of pumps and fans, coils, electrical repairs and checking of controls.

Air Distribution Equipment. Cleaning air ducts and grilles, repairing insulation on ducts, painting ducts, and checking dampers.

Water-Using Equipment. Treatment of water, lubrication of pumps and fans, checking of piping and valves, painting, and cleaning.

Cooling Equipment. Recharging refrigerant, lubrication, checking of V-belts, maintenance of compressors, checking of motors and controls, checking of valves and piping.

Air conditioning equipment is designed to perform a particular function in the most efficient manner possible and to give good mechanical performance. But before the expected results can be achieved, it is necessary to (1) so install the unit that there are no conditions that are detrimental to good operation; (2) operate and maintain the unit so that a continuance of satisfactory operation is assured.

The discussion which follows was prepared by F. Edward Ince of Marlo Coil Company. It is concerned with cooling towers, evaporative coolers and evaporative condensers, and also with air conditioning units.

One point that many engineers slight is that not only must equipment have enough space for installation, but there must be sufficient clearance around the unit to enable proper servicing and operation. There should be sufficient space to permit oiling of bearings, removal of coils, fans and shaft, eliminators and wetted deck surface, servicing the spray water pump and strainer and for the air conditioning unit; enough room for servicing fan and pump motors, and the belts. Space should be allowed to permit the use of brushes and other equipment to clean the coils in the unit.

It is important that the units are lined up horizontally and vertically so that there will be proper slope for satisfactory drainage.

Air discharge from water-saving devices should be above the roof line, and well above and as far as possible from the air intake. Since dirt and fumes carried into the unit aggravate the problem of keeping clean the heat transfer surfaces, air entering the apparatus should be kept as free as possible from dirt, fumes and steam. Simple upward direction of the air discharge is not sufficient, and the back-wash effect of air currents flowing over buildings should be taken into consideration. Both the air inlet and outlet should be kept free from obstructions that might impede the free flow of air. Runs of discharge duct inside the building should be insulated to reduce condensation on the inside and the ducts should be made water tight.

Before starting equipment, remove the belts and be sure that fans and pump rotate freely. Fill the oil cups on the fan and motor bearings before the electric wiring is completed. Then check the motor and replace the belts. Belts should be adjusted to prevent slipping when starting. However, too much tension will cause rapid wear on both belts and bearings and an unnecessary load on the motor. It is important to check the motor for correct rotation. Directional arrows serve as a guide.

Fill the pump with water and then check and adjust the float valve to maintain proper water level—not more than one inch below the overflow pipe. Place the waste line from the spray header inside the overflow cap. Next open the waste line valve at the spray header about two turns, and with the aid of a gallon bucket, check the flow rate. Set the waste at about 2 gph per ton of refrigeration or per 15,000 Btu per hr heat rejection, and then adjust as required under operation.

Since the spray water system is designed to maintain a running film of water on all heat transfer surfaces, it is necessary to maintain the spray pumping unit in good operation. As one check, see that pump and motor bearings are properly lubricated, that the stuffing box is not binding the shaft, and that the fan and pump belts are maintained in proper tension and alignment. It is advisable to waste enough water so that the mineral concentration does not exceed that point at which scale will form. One must remember that in operation about one pound of water is evaporated per 1,000 Btu and that the mineral content of this water is left after evaporation takes place.

Some mineral salts are more scale-forming than others, and it may be advisable to treat the water with compounds which form soluble and non-scaling type of salts after combining with whatever minerals are present. Where wasting of water does not solve the problem, water treatment by some competent company is recommended.

From the cleaning standpoint, it is important that the sump tank should be drained and cleaned often enough to prevent large accumulations of sediment that are carried into the unit through the air stream. Pump suction strainer should be cleaned and the

spray nozzles checked to see that each is producing a full spray cone and that all parts of coil or wetted deck surface are flooded. Air intake screens should be kept free of leaves and paper, and a check made that boxes or crates do not obstruct free flow of air into the unit.

It is important to note (1) the in-going and out-going temperatures of the fluids to be cooled, (2) temperature of the spray water, (3) the in-going and out-going air temperature, and occasionally (4) the volume of the air. Readings that deviate from normal, indicate the need for closer inspection of the apparatus and the equipment served by it.

All systems using a direct expansion refrigerant should be thoroughly tested for leaks before and after the system is charged with the refrigerant. Particular attention should be given to the thermal valve packing. Avoid any condition that creates gas in the liquid line but if such a condition is unavoidable, provide adequate subcooling of the liquid with a heat exchanger to prevent gasification.

Water coils, sump pan, and various water lines, should be adequately drained and blown out for winter operation to prevent freezing of these components. During winter operation, if the unit is shut down for any period, the steam coils should also be drained to prevent freezing. Water and steam coils are circulated and sloped in the unit at the factory for proper drainage. Precautionary methods should be taken at all times during winter operation to prevent freezing in the steam coils. Adequate filters should be placed on water, steam and humidifier lines to prevent dirt accumulation in the coils.

The pump should be located as close as possible to the unit sump tank and one should always avoid a high suction lift. In no case should the total suction lift, including friction in the pipe, be more than 15 ft. If the pump is to handle hot water, it must be so located that water will flow freely into the suction.

On units with face and bypass dampers, make certain that the dampers are properly linked for full opening and closing.

Periodic maintenance and inspections should be enforced to insure long and dependable service. About every 60 days inspect the damper bearings and linkage, and check fan and motor bearings. A suitable oil should be added. Fans and scrolls should be free and clean of all foreign matter.

Once a year, it is good policy to shut down the unit and thoroughly clean all surfaces, remove all scale and rust deposits and protect surfaces with a good corrosion resistant paint where necessary. One should remember that the misuse of strong acids or alkali solutions is dangerous and can result in serious damage to this equipment. Interior parts should be brushed and freed of loose particles. As a safeguard, paint bare metal before using any cleaning solutions. After using any chemical, wash, brush clean all surfaces, and repaint as necessary for further protection. However, do not paint coils on evaporative coolers.

Pumps require attention. Clean, flush and inspect the pump, checking water passages and impeller clearance; clean and regrease pump bearings; and every six months, the pump should be greased. All worn or damaged parts should be replaced. In addition, inspect the motor and motor mounting brackets and at the same time clean and oil the motor. However, keep oil away from fan belts and pulleys. Inspect pulleys for worn or damaged grooves and make such replacements as are necessary.

Maintenance resolves itself into a program of cleaning and inspection. Every 60 days, the fan and motor bearings should be checked and the proper type of oil added. Also periodically check the tightness and alignment of belts.

Clean the strainer and the pipe in the spray piping as often as necessary. There is no set rule for the periodic cleaning of spray piping and nozzles, but when any nozzle does not have a full cone spray, it should be cleaned. The constant waste valve and waste line should be checked periodically to insure free flow of waste water to the drain. Examine the float valve for proper function, and replace the valve seat if it is worn.

At regular intervals, inspect the water humidifier and steam jet humidifier nozzles, and clean if necessary. On vapor pan humidifiers check for the proper functioning of the float valve. Because of water evaporation, these pans will accumulate salt scale deposits so that it is important to flush the pans at least once a month during the winter season.

All coils should be carefully washed with a hose once a month to remove accumulated lint or foreign matter carried to the unit by the air stream. Fans and scrolls should also be washed or brushed down to remove the accumulated dirt. Incidentally, clean or replace air filters when dirty.

Before a unit is to be shut down for a long period of time, at the end of either the cooling or heating season, it should be thoroughly drained, well flushed out and cleaned, belt tension relieved, and the unit given a coat of corrosion-resistant paint, especially in spots where rust might appear.

The sump pump on spray type dehumidifier units should be drained and thoroughly flushed at least once every two weeks. If scale deposits appear on the cooling coils, the water should be treated.

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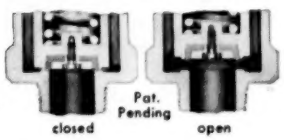

"Controlled cushion" cup seat disc construction

Type 52 Angle Relief Valve

This forged brass valve is available in sizes (inlet x outlet) ½" M.P.T. x ⅝" Flare and ⅝" O.D.S. x ⅝" O.D.S.

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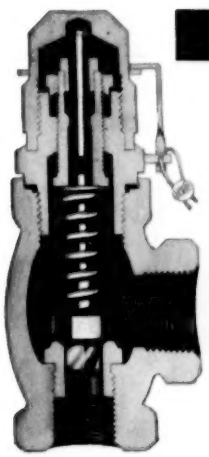

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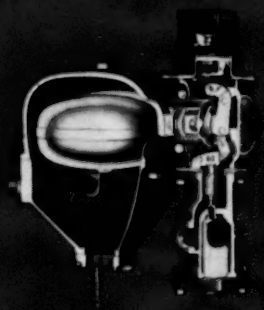
Make these a "must" on HOT WATER space heating BOILERS

McDONNELL Safety Feeders and Low Water Cut-off Combinations

McDonnell No. 247-2

Feeder Cut-off Combination. Protects hot water boilers against low water by adding water when needed, and stopping burner if level drops to emergency zone. (Also available without cut-off switch, for hand-fired boilers, as No. 247.)



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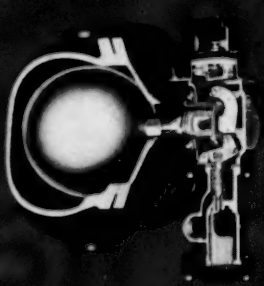
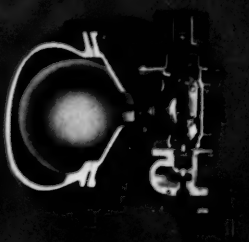
for larger hot water space heating boilers. (Available without cut-off switch, for hand-fired boilers, as No. 51.)



McDonnell No. 53-2

for higher pressure hot water space heating boilers. (Also available without cut-off switch, for hand-fired boilers, as No. 53.)



The primary safety device for a hot water space heating boiler is of course an ASME rated pressure relief valve. But it isn't the whole answer by any means.

It is a well known fact that a low water condition can occur in a hot water boiler just as it can in a steam boiler. The results are also similar—damaged equipment and costly repairs or replacements.

There are many possible reasons. Some of the more common are listed at right. New ones come to light all the time.

The only positive approach to the problem is to provide a float-operated mechanical means of adding water automatically when a low level condition occurs. An alternate solution is to interrupt current to the burner if the water level drops into the emergency zone. Best solution is a combination of both mechanical and electrical safeguards.

It is a solution that is rapidly gaining support on all sides. Many consulting engineers and utility companies recommend it. Many local codes and federal specifications insist on it.

So, for the best safety control on a hot water space heating boiler, include one of the McDonnell Feeder Cut-off Combinations shown here. They are the most widely used, time-tested devices of their kind.

For engineering data and selection chart write for Bulletin L-114.

McDONNELL & MILLER, Inc.
3500 N. SPAULDING AVE., CHICAGO 18, ILL.

Doing One Thing Well

-here's why Hot Water Boilers need Low Water Protection

1 Relief Valve Discharge caused by overfiring

- ✓ Gas valve fails to close.
- ✓ Burner placed on manual operation.
- ✓ Failure of limit controls.
- ✓ Zoned system isolating boiler from distribution.
- ✓ Excessive carry-over of heat from hand-fired or stoker installations.

2 Loss of Water in distribution system

- ✓ Leaks in piping caused by expansion breakage or corrosion.
- ✓ Leaks through pump or other operating equipment.

3 Loss of Water due to carelessness

- ✓ Draining boiler for repair or summer lay-up without eliminating possibility of firing.
- ✓ Drawing hot water from boiler.

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Water Level Controls